AL-TR-1991-0097

AD-A244 805

DTIC
S ELECTE JAN 2 4 1992 D
D

(2)

ANALYSIS OF MEASURED ENVIRONMENTAL NOISE LEVELS: AN ASSESSMENT OF THE EFFECTS OF AIRBASE OPERATIONAL MODEL VARIABLES ON PREDICTED NOISE EXPOSURE LEVELS

92-01981

W. R. Lundberg

OCCUPATIONAL AND ENVIRONMENTAL HEALTH DIRECTORATE
BIOENVIRONMENTAL ENGINEERING DIVISION

JUNE 1991

FINAL REPORT FOR FIELD MEASUREMENT JULY 79 – MARCH 80
AND ANALYSIS JUNE 89 – DECEMBER 90

92 1 23 062

AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433-6573

NOTICES

TECHNICAL REVIEW AND APPROVAL

AL-TR-1991-0097

This report has been reviewed by the Office of Public Affairs (PA) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

REPORT DOCUMENTATION PAGE	Form Approved OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	June 1991	Final Jul 79 - Mar 80, Jun 89 - Dec 90

4. TITLE AND SUBTITLE Analysis of Measured Environmntal Noise Levels: An Assessment of the Effects of Airbase Operational Model Variables on Predicted Noise Exposure Levels

5. FUNDING NUMBERS
PE: 62202F
PR: 7231
TA: 34
WU: 08

6. AUTHOR(S)
WAYNE R. LUNDBERG

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Occupational & Enviornmental Health Directorate
Bioenviornmental Engineering Division
Noise Effects Branch, Armstrong Laboratory
Human Systems Division
Wright-Patterson AFB, OH 45433-6573

8. PERFORMING ORGANIZATION REPORT NUMBER
AL-TR-1991-0097

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE
A

13. ABSTRACT *(Maximum 200 words)* This report presents an exhaustive study of measured noise data collected over a three week period at McChord AFB. The NOISECHECK methodology for comparing noise predictions to measured noise data was used in an effort to quantify the complicating factors relevant to airbase environmental noise prediction. These factors are dominated by parameters of the aircraft operations model. The operational model parameters are segregated and their effects on noise level predictions discussed, using the Probability of Consistency as a measure of their overall impact. It was found that noise generation was very sensitive to relatively small changes in power setting. The operational model of aircraft altitude and track location produced the most significant effects on predicted noise levels. The level of detail analysis attained allowed further assessment of the problems of noise generation and propagation modeling. The detailed NOISECHECK Sound Exposure Level analysis was automated using a database management system, which greatly reduced the effort required to conduct the repeated analyses required for this study. The retrieval and comparison of NOISEMAP noise level predictions were also automated. An accurate approach to estimating the operational parameters needed to model variable aircraft operations was developed and partially validated.

14. SUBJECT TERMS
Acoustics
Noise (Sound)
Environmental Noise
Noise Model
Aircraft Performance

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED

NSN 7540-01-280-5500

Standard Form 298 (Rev 2-89)
Prescribed by ANSI Std Z39-18
298-102

GENERAL INSTRUCTIONS FOR COMPLETING SF 298

The Report Documentation Page (RDP) is used in announcing and cataloging reports. It is important that this information be consistent with the rest of the report, particularly the cover and title page. Instructions for filling in each block of the form follow. It is important to ***stay within the lines*** to meet ***optical scanning requirements***.

Block 1 Agency Use Only *(Leave blank)*.

Block 2. Report Date. Full publication date including day, month, and year, if available (e.g. 1 Jan 88). Must cite at least the year.

Block 3. Type of Report and Dates Covered. State whether report is interim, final, etc. If applicable, enter inclusive report dates (e.g. 10 Jun 87 - 30 Jun 88).

Block 4. Title and Subtitle. A title is taken from the part of the report that provides the most meaningful and complete information. When a report is prepared in more than one volume, repeat the primary title, add volume number, and include subtitle for the specific volume. On classified documents enter the title classification in parentheses.

Block 5. Funding Numbers. To include contract and grant numbers; may include program element number(s), project number(s), task number(s), and work unit number(s). Use the following labels:

C	-	Contract	**PR**	-	Project
G	-	Grant	**TA**	-	Task
PE	-	Program Element	**WU**	-	Work Unit Accession No.

Block 6. Author(s). Name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. If editor or compiler, this should follow the name(s).

Block 7. Performing Organization Name(s) and Address(es). Self-explanatory.

Block 8. Performing Organization Report Number. Enter the unique alphanumeric report number(s) assigned by the organization performing the report.

Block 9. Sponsoring/Monitoring Agency Name(s) and Address(es). Self-explanatory.

Block 10. Sponsoring/Monitoring Agency Report Number. *(If known)*

Block 11. Supplementary Notes. Enter information not included elsewhere such as: Prepared in cooperation with...; Trans. of...; To be published in.... When a report is revised, include a statement whether the new report supersedes or supplements the older report.

Block 12a. Distribution/Availability Statement. Denotes public availability or limitations. Cite any availability to the public. Enter additional limitations or special markings in all capitals (e.g. NOFORN, REL, ITAR).

DOD - See DoDD 5230.24, "Distribution Statements on Technical Documents."
DOE - See authorities.
NASA - See Handbook NHB 2200.2.
NTIS - Leave blank.

Block 12b. Distribution Code.

DOD - Leave blank.
DOE - Enter DOE distribution categories from the Standard Distribution for Unclassified Scientific and Technical Reports.
NASA - Leave blank.
NTIS - Leave blank.

Block 13. Abstract. Include a brief *(Maximum 200 words)* factual summary of the most significant information contained in the report.

Block 14. Subject Terms. Keywords or phrases identifying major subjects in the report.

Block 15. Number of Pages. Enter the total number of pages.

Block 16. Price Code. Enter appropriate price code *(NTIS only)*.

Blocks 17. - 19. Security Classifications. Self-explanatory. Enter U.S. Security Classification in accordance with U.S. Security Regulations (i.e., UNCLASSIFIED). If form contains classified information, stamp classification on the top and bottom of the page.

Block 20. Limitation of Abstract. This block must be completed to assign a limitation to the abstract. Enter either UL (unlimited) or SAR (same as report). An entry in this block is necessary if the abstract is to be limited. If blank, the abstract is assumed to be unlimited.

EXECUTIVE SUMMARY

This report covers a variety of issues relevant to the creation and verification of USAF airbase noise exposure level contours. The primary focus of discussion is to illustrate the importance of proper handling of the various parameters used in the modeling of aircraft operations. Several models of the McChord operations are presented to highlight the effects of operational parameters such as aircraft performance profiles, location of flight tracks, and other factors such as the atmospheric conditions and grouping of transient operations.

A quantitive assessment of these operational models are provided by application of the NOISECHECK procedural analysis of measured noise data collected at McChord AFB. The technical details of the analysis are presented for those who may need to undertake such a noise survey. The NOISECHECK procedures were automated during this effort to facilitate the repeated analysis of measured and predicted noise data. The formulation and application of automated analysis methods are fully documented.

The bulk of this report discusses in some detail an approach to improving the existing McChord AFB airbase operations model. The fundamentally important aspects of the model are examined and defined in a manner appropriate to obtain an objective and accurate comparison via the NOISECHECK procedural analysis. Numerous individual aircraft operations are examined and adjustments made to the operational profiles deemed important to achieving an operations model which correlates well with the measured noise data. The systematic evolution of a highly consistent operations model exemplifies various types of adjustments made and allows quantification of detailed noise prediction effects which would otherwise be obscured by the dominant noise contributing operations.

Conclusions are drawn regarding requirements for similar noise measurement surveys and use of multi-site correlation as a means of analyzing site measured noise data. The value of the integrity of separate operational parameters is established. A specific analytic method of deriving an operational profile model from actual operations data records is recommended.

PREFACE

This study was performed for the Armstrong Laboratory at Wright-Patterson Air Force Base, Ohio, under Project 723134, Exploratory Noise and Sonic Boom Research by the Noise Effects Branch, Bioenvironmental Engineering Division.

The author is grateful to Mr John Cole (retired) for his initial guidance in performing this study, and respectfully acknowledges the technical guidance of Mr Jerry Speakman. This study would not have been possible without the use of NOISEMAP 6.0, developed by Wyle Laboratories, and the development of BASEOPS and other programs by Mr Henry Mohlman of the University of Dayton, as well as the assistance of Ms Jackie Brennaman and Ms Bea Heflin in the preparation of the report.

TABLE OF CONTENTS

LIST OF FIGURES

List of Tables

List of Symbols, Abbreviations, and Acronyms

a,b,c	Locally defined constants
Alt_k	Operational altitude associated with an individual measured noise event
AOP	Airbase Operational Profiles (BASEOPS input)
AORT	Aircraft (group), Operation, Runway, and Track sort code and profile name
$AORT_i$	Operation type having measured noise contributing rank i
$AORT_j$	Operation type having predicted noise contributing rank j
c.i.( )	Confidence Interval of the quantity ( ), usually 90% (or 95%) c.i.
DNL	Day-Night [energy] Average Sound Exposure Level (24 hour normalization)
DNL'	Background adjusted daily measured DNL
DNL_{BG}	*NOISECHECK estimate of background DNL*
DNL_c	NOISEMAP total predicted DNL
DNL_{ct}	NOISEMAP cumulative DNL for (1=18) predicted noise contributing operations
$DNL_{c,j}$	Predicted partial DNL for the operation type having predicted noise contributing rank j
DNL_n	Daily measured DNL having been normalized to the NOISEMAP effective total nuber of operations per day
DNL_m	Normalized measured [energy] averaged DNL for the measurement time frame
DNL_s	Synthesized DNL for (1) measured partial DNLs
$DNL_{s,i}$	Measured partial DNL for the operation type having measured noise contributing rank i
DNL PoC	Probability of Consistency of the NOISEMAP predicted DNL compared to the measured average DNL

E_k	Acoustic Energy of an operationally correlated noise event
e	Vapor pressure
e_s	Saturation vapor pressure
HNL	Hourly [energy] averaged Noise Level (1 hr)
i	Rank order of a measured noise contributing operation
j	Rank order of a predicted noise contributing operation
k	Index number of an individual noise event which has been correlated to a particular operation type
l	Number of noise contributing operations included in the accumulation of DNL_s or DNL_{ct}, (18)
m	Number of days in the measurement period
n	Day number
n_i	Measured effective number of operations for the operation type with measured noise contributing rank i
$N_f(n)$	Measured total effective number of operations on day number n
N_i	Measured daily (period averaged) effective number of operations for the operation type with measured noise contributing rank i
$N_i(n)$	Measured effective number of operations for the operation type with measured noise contributing rank i, on day number n
N_j	NOISEMAP (yearly averaged) effective number of operations per day for the operation type with predicted noise contributing rank j
N_k	Effective number of operations associated with an individual measured noise event (0, 1, or 10)
N_{NM}	NOISEMAP total (yearly averaged) effective number of operations per day
PMA	Perceived Mean Altitude (Altitude estimate for modeling many individual operations)

PoC	Probability of Consistency
p(z)	Probability that an event with acoustic energy less than that associated with z occurs
R	A statistical intermediate variable
SEL	Sound Exposure Level (1 sec normalization)
SEL_i, ^SEL	Measured [energy] averaged Sound Exposure Level, for the operation type with measured noise contributing rank i
SEL_j	Predicted Sound Exposure Level for the operation type with predicted noise contributing rank j
SEL_k	Individual measured SEL for an operationally correlated noise event
SEL PoC	Probability of Consistency of the NOISEMAP cumulative DNL as compared to the DNL synthesized from measured operational ^SELs, using the top (1) noise contributing operations
$Sigma_{( )}$ or $_{( )}$	The [sample] standard deviation of the acoustic energy associated with the subscript
t	Time
T	A statistical intermediate variable
T	Temperature
V	NOISECHECK estimated variance of SEL_j
z	The statistical standard score in a normal distribution of acoustic energy producing events
z_c	The statistical standard score assiciated with a confidence interval
%RH	Relative Humidity in percent
^( )	Notation connotating an acoustic energy averaged quantity ( )

AIRBASE OPERATIONS MODELING

INTRODUCTION

The environmental noise produced by aircraft operating around an air installation is predicted numerically by methods which incorporate two basic elements, an aircraft operations model and a noise prediction model. The aircraft operations model describes what, where, and how aircraft are being flown or runup. The noise prediction model calculates the noise generated and propagated to ground locations by such aircraft operations.

The scientific integrity of these methods can be determined by conducting a detailed comparison of the resultant noise predictions to field noise measurements. The environmental noise survey previously conducted at McChord AFB provides the noise measurements for such a comparison. Due to the volume of noise measurement data collected, some effort was made to automate the procedures involved in the comparison. A detailed discussion of many aspects of noise modeling was thus made possible. This report will focus on predicted noise level effects due to the aircraft operations model, and include measurable effects from the noise generation and propagation model. The individuals responsible for airbase operations modeling may thus be made aware of which factors are important to maintain the accuracy of the overall predicted noise contours.

NOISE PREDICTION AND MEASUREMENT ANALYSIS

The Department of Defense has adopted the Air Installation Compatible Use Zone (AICUZ) concept to promote land use development near it's airfields in a manner which will not only protect adjacent communities from the noise and safety hazards associated with aircraft operations, but also preserve the operational capability of its airfields. The AICUZ report employs the NOISEMAP noise contouring program for predicting levels of aircraft noise exposure in and around the airbase. The NOISEMAP program development has recently introduced a revised lateral attenuation algorithm and a separate program (BASEOPS) to facilitate the generation of the required input operational data. Both programs now run on IBM PC compatible computers. In addition, the NOISECHECK monitoring system and analysis procedures have been developed to aid in resolving controversy surrounding NOISEMAP predicted noise exposure levels.

The NOISEMAP predicted noise level contours are quantified by the Day/Night Average Sound Exposure Level (DNL) metric. This quantity represents the cumulative noise exposure level of the aircraft operations conducted on an "average busy day". Each aircraft operation generates a separate noise event on the ground which is quantified by the Sound Exposure Level (SEL) metric. The DNL represents the average noise level (in A-weighted decibels, dB) which, if produced continuously day and night, would expose a site to the same cumulative amount of acoustic energy produced by all aircraft movements during daytime plus a night weighting factor of ten times the energy produced by nighttime operations. The SEL, similarly, is the continuous noise level of one second duration which is equivalent to the total acoustic energy of a single aircraft flyover (or other) noise event.

The NOISECHECK analysis methodology allows comparisons to site measured noise data which evaluate either the NOISEMAP overall DNL prediction or the cumulative effects of all the SEL predictions for important noise producing operations at a site. The DNL analysis is relatively simple to implement, but if significant noise level differences exist, it gives no clear indication of which facet of the aircraft operations model is at fault. The energy averaged SEL (ˆSEL) analysis requires detailed records of numerous individual aircraft operational noise events for all the dominant noise-producing aircraft operations. The comparison of measured ˆSELs to equivalent SEL predictions identifies which aircraft's operational modeling is producing the erroneous noise level predictions. The mathematical formulation of these analytic methods is described starting on page 17, and their implementation in Appendix A.

THE IMPORTANCE OF INTEGRITY IN THE AIRBASE OPERATIONS MODEL DESCRIPTION

There are essentially two aspects of noise level predictions which effect the long-term value of an Airbase Operational Profiles (AOP) model. These are its consistency with the overall noise level contour measurements (where available) and its ability to retain such consistency when operational changes are made. The Probability of Consistency (PoC) metric is formulated to indicate the consistency of an AOP model's predicted DNL versus a limited quantity of measured noise exposure data for a given ground location. An AOP model's predicted DNL may include compensating errors in its predictions for individual operational noise levels and still result in a high degree of overall consistency, in localized areas. A strongly defensible airbase operations model suitable for planning purposes will have each of the major noise contributing operations modeled accurately, so that the predicted operational SELs agree well with the respective measured ^SELs. Such detailed consistency will not only verify the predicted noise level contour over broad areas, but will also support plans for operational restructuring where it is desired to reduce noise exposure at specific noise-sensitive ground locations.

This report will exemplify the sensitivity the PoC has to the accuracy of the performance profile modeling of aircraft operations. Comparison to actual measured noise data will provide a quantitative assessment of all factors involved in the operational modeling separately, so that base planners may observe the impact of each type of aircraft operational profile variable. The description of aircraft operational profiles is divided into the following topics for discussion: Aircraft Performance, including power setting and altitude changes; and Aircraft Tracking, particularly flight track dispersion. The noise measurement comparison will also demonstrate that all types of aircraft flight patterns which create different patterns of noise on the ground must be included separately in the airbase operations model. The integrity of this aspect of the AOP model is important to the modeling effort, but since it requires the addition of different operational profiles, its impact will be discussed separately from the effects of operational profile variables.

There are two means of assuring that an individual operational profile model has integrity in comparison to the many actual flight operations it is intended to model. An experimental means of assurance requires that a detailed NOISECHECK study be conducted, like the analytic comparisons to measured noise data which were conducted in the course of this study. A theoretical means of assurance is more appropriate to the usual process of airbase operational planning. The best theoretical assurance requires that the

physics of the acoustic energy average and the influence of operational performance parameters be considered in the process of arriving at the model operational profile. The following section presents an approach to this process which accommodates the dominant physical effects involved in environmental noise prediction. Using such an approach will allow the operations model planner to develop a model operational profile from the information which is typically available, and have a reasonable assurance that the resulting model is a good scientific approximation of the planned aircraft operations.

The integrity of the complete airbase operations model is also dependant on two factors which have a broad impact on noise predictions; the weather used to typify the atmospheric absorption of sound at the airbase, and the treatment of transient aircraft operations. The appropriate weather to be used is determined by the methodical analysis of the local monthly climate summary. The treatment of transient aircraft operations has been simplified by the recent addition of a library of typical aircraft operational profiles, which may be used in conjuction with BASEOPS for aircraft operations which are not dominant noise contributors. Nonetheless, it is acceptable, and was formerly common, to group some transient aircraft operations together for simplicity. How well such grouping is planned may have a significant impact on the integrity of the airbase operational profiles model. The quantitative impact that these factors had on noise predictions of the airbase operations model developed during this study will be assessed in a later chapter (pg 33).

Deriving a Nominal Flight Profile from Aircraft Performance Records

It will be valuable to an airbase operations planner to have an understanding of a scientifically valid approach to the task of creating an aircraft operational profile model which predicts noise levels approximating the energy averaged noise levels produced by numerous actual aircraft flights. The success of the Perceived Mean Altitude approach (pg 50) gives some experimental support to the methods which will be described in this chapter. The McChord operational database did not provide information on aircraft power settings used or the actual ground flight tracks flown, so no experimental verification of the overall method was possible in this study. Since power setting and tracking information are normally available to an airbase operations planner, the following approach will advocate the best physical analysis possible of all the available performance data.

A hypothetical set of aircraft operational performance records was constructed to exemplify the information required, the methods used, and to indicate the results

which can be achieved by applying these methods. The F-16 aircraft was chosen because its noise level versus power setting function was very nearly linear over most of the range of power settings available (Figure 1).

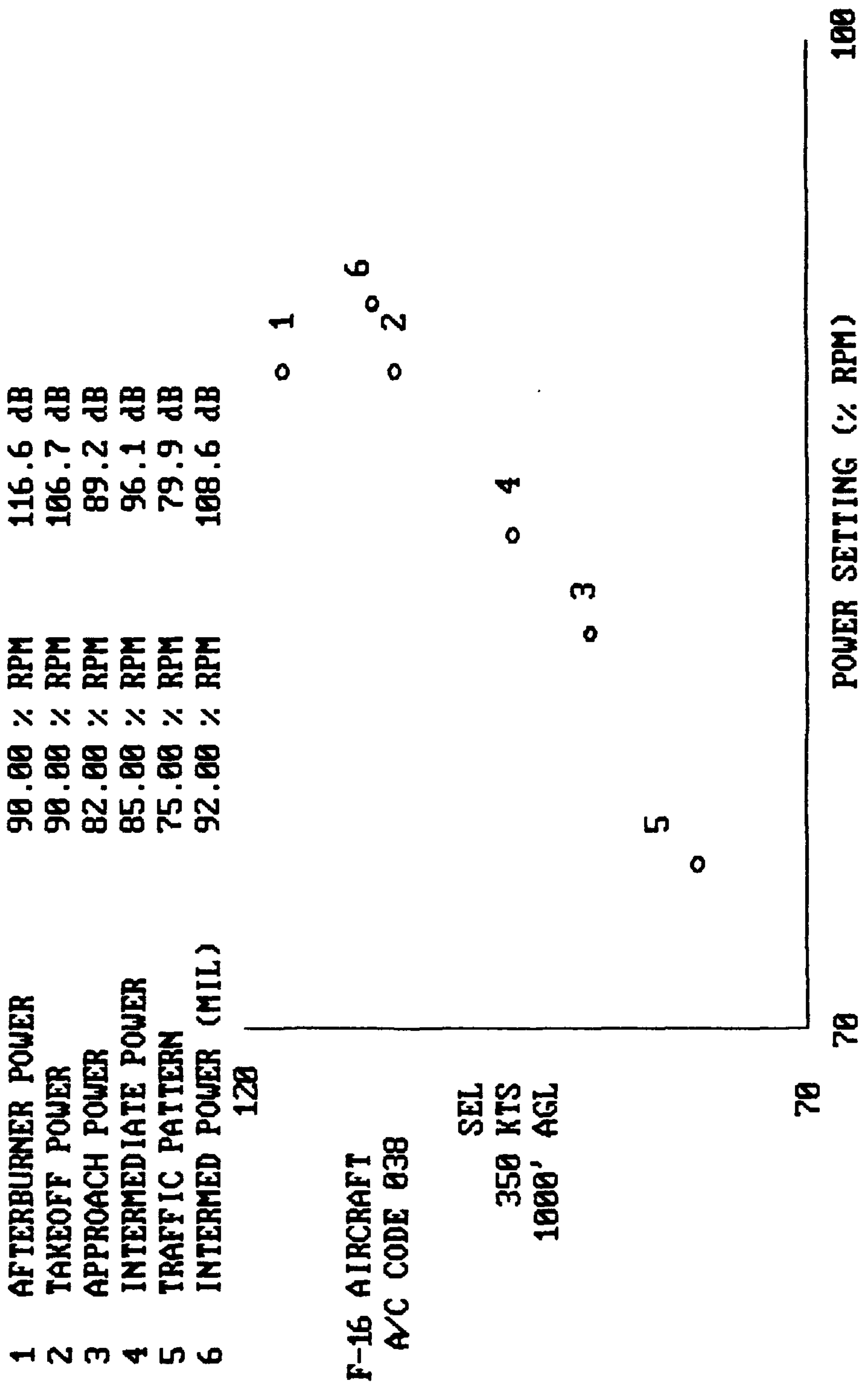


Figure 1. The Relationship Between SEL and Engine Power Setting for the F-16 Aircraft

The F-16 aircraft engine's "Intermediate" power setting was chosen since it is used in the cruise mode, during which the greatest variability in applied power setting is likely. Power settings between 83% and 87% were used, with 83% having the most frequent occurrence. Airspeed was considered to be a linear function of the power setting, and was not treated as an independant variable. A normal dispersion of aircraft flight tracks and altitudes was constructed, having a large scatter so that the effects of flight path dispersion were accentuated. The power settings were randomly assigned to the various flight paths, to arrive at a set of 18 operational flight profiles modeling individual aircraft flights. The information used in place of actual operational data is summarized in Table 1 and plotted in Figure 2.

Table 1. Summary of Sample Aircraft Operational Data Constructed to have a Large Amount of Scatter

	Flight Number	Lateral Offset (feet)	Model Track	Altitude (feet)	Power Setting (%RPM)	Airspeed (Knots)
	F1	-1000	A	600	83	280
	F2	-500	B	700	84	290
σ_-	F3	-500	B	1200	85	300
	F4	-300	C	400	83	280
	F5	-300	C	1000	83.5	285
	F6	-200	D	800	85	300
	F7	-100	E	700	84	290
	F8	-100	E	900	84.5	295
	F9	0	F	900	86	310
	F10	0	F	1500	84	290
	F11	100	G	700	87	320
	F12	100	G	800	83.5	285
	F13	200	H	500	85.5	305
σ_+	F14	200	H	900	83	280
	F15	400	I	800	83.5	285
	F16	600	J	800	84.5	295
	F17	800	K	700	86	310
	F18	1000	L	1200	83	280

NOTE: The 'actual' operations have been separated into three sets as indicated by the horizontal lines.

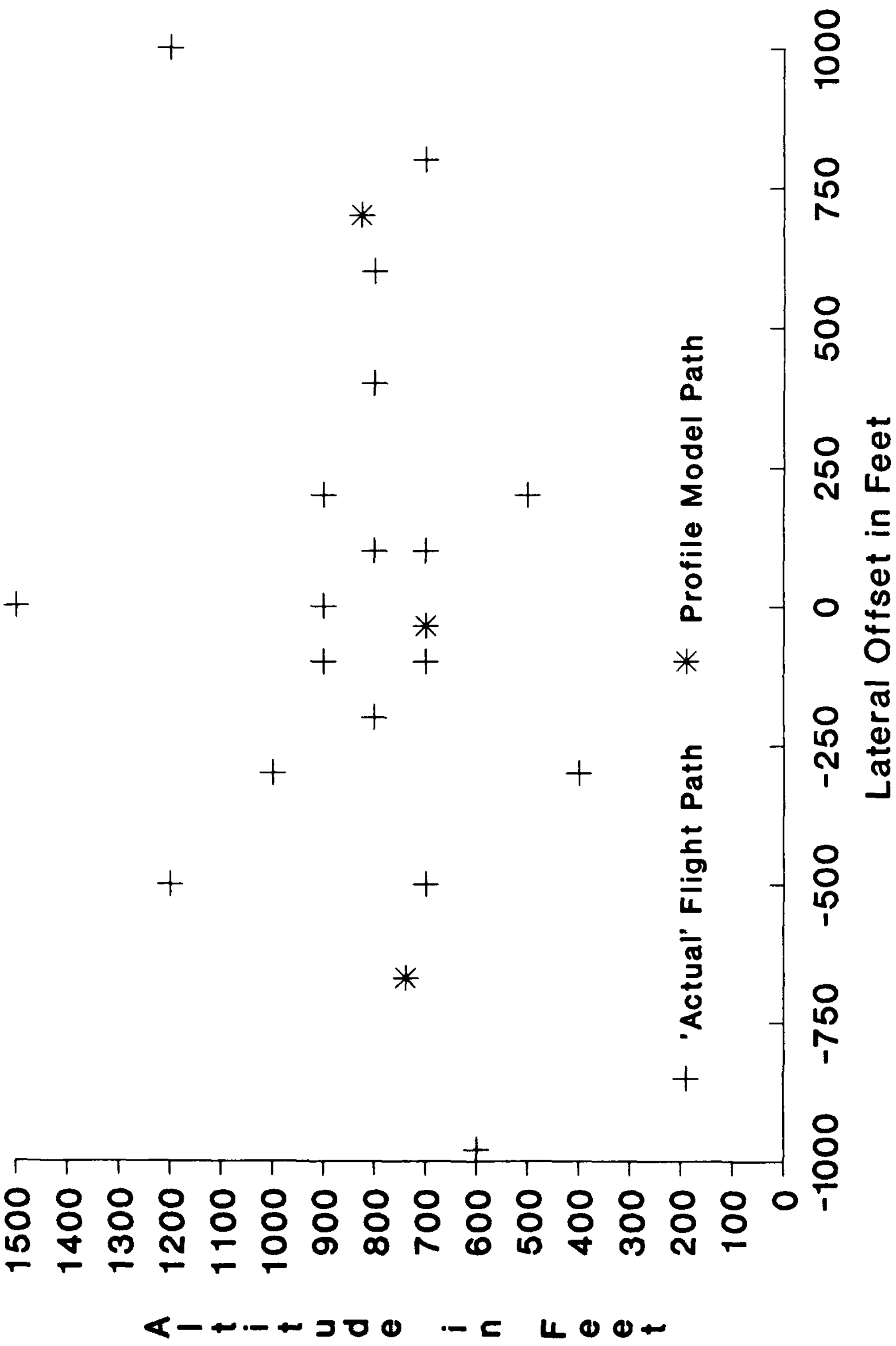


Figure 2. Plot of the Dispersion of 18 Aircraft Flyovers

A multi-track operational model of these dispersed operations can be derived in three steps: (1) derive the flight track lateral locations, (2) derive the effective altitude for each model flight track, (3) derive the effective power setting (and consequent airspeed) for the modeled operation on each flight track.

Step 1 is implemented to obtain an accurate lateral dispersion model, in noise-sensitive situations, by using a three track model approach. More tracks may be needed for particularly disperse, loud operations, if they are considered to be the same operation type. A statistically normal distribution of flight paths shall be modeled by partitioning the full set of aircraft operations into three sets determined by the size of the standard deviation of lateral offsets. The lateral offset is the distance between the 'actual' flight track and the 'assigned' flight track. The central set of aircraft operations (those whose lateral offsets are within the bounds of the standard deviation) will comprise about 68% of the operations. The remaining two (port and starboard) sets of aircraft operations will be comprised of those operations whose lateral offset is greater than the positive standard deviation, or less than the negative standard deviation. The three sets of operations are modeled by three flight tracks, here named AC, AR, and AL, respectively. These model flight tracks are defined to have a lateral offset equal to the linear average of the 'actual' lateral offsets of the flights included in their respective sets of operations.

The second step is to derive an effective altitude for each model operational profile. The Perceived Mean Altitude (PMA) function was validated during this study (pg 51) for use in this regard. The average of the inverse squares of a set of 'actual' altitudes is calculated, and then the inverse square root of this average is derived. The resulting PMA is then incorporated in the respective nominal flight profile model of each set of flights. Use of the PMA calculation is more important for operation types having a relatively large (>10%) vertical dispersion.

The third step requires that the variability of engine power setting be characterized. For small deviations ($\pm$1%) in power setting, the linear average of power settings within each set of flights may be used to characterize the set. For a moderate variability of power setting (between 1% and 10%), it is more appropriate to calculate an exponential average power setting which will roughly equate with the power setting required to produce the acoustic energy average noise level of the flights in the set. For a large variability in power setting (>10%) it will be necessary to determine a set of predicted individual noise levels, energy average the acoustic levels, and determine the effective power setting which would produce the averaged noise level.

This process involves careful examination of the SEL versus power setting function (i.e., Fig 1) for the aircraft under consideration. It is more practical to break up a highly variable operations set into two subsets having less variability in the operational power setting.

The example has a moderate variability of engine power setting, since a large variability is quite uncommon for any particular operation type. The predicted SEL is assumed to be a nearly linear function of power setting, so that it will suffice to "exponential average" the power settings. This calculation requires that the value of the numbers being averaged be between 1 and 10. For power settings given in %RPM, this means they must be divided by ten. An exponential average power setting is then calculated in a way similar to an acoustic energy average noise level, for all the flights in the set:

$$\hat{}\%RPM = 10\mathrm{Log}(\mathrm{Ave}(10^{\%RPM/10})) \ .$$

The third step is then concluded by determining the airspeed which will be realized by application of the effective power setting. Airspeed is considered to be a dependant variable of power setting and altitude. Airspeed is also dependant on the drag configuration, which must be fixed for flights of a given operation type. For the example case, the modeled airspeed was arrived at by linear interpolation between NOISEFILE airspeeds, based on the applied power setting. The three nominal flight profile models are then defined by the parameters listed in Table 2.

Table 2. Summary of Nominal Aircraft Operational Profiles Used to Model the Example Set of 18 Flights

Name	Number of Ops	Lateral Offset (feet)	Model Track	Altitude (feet)	Power Setting (%RPM)	Airspeed (Knots)
AL	3	-670	X	738	84.1	291
AC	11	-36	Y	698	84.6	296
AR	4	700	Z	826	84.4	294

The cumulative DNLs resulting from the full set of 18 individual flights, as well as the DNLs predicted for the set of three nominal flight profile models, are given in Table 3 for three representative sites near the operational flight pattern.

Table 3. Cumulative DNLs Resulting from 18 'Actual' Operations Compared to DNLs Predicted by the Three-Profile Model of the Operations

	DNLs in dB		
Site Name:	L	C	R
Location:	-1000'	0'	1000'
18 'Actual' Ops:	57.41	60.75	58.17
3 Modeled Ops:	57.54	60.71	57.49

The accuracy of this modeling method is now evident. It should be noted that, in addition, the modeling of flight track dispersion had a considerable impact on the DNLs. The operational model profiles (AL, AR) which simulate dispersed operations contributed over 2 dB to the overall DNL at the side locations, but account for only ~1 dB at the center. Use of this method for modeling flight track dispersion will improve the Probability of Consistency across the entire area of noise impact.

DEVELOPMENT OF A CONSISTENT AIRBASE OPERATIONS MODEL USING THE RESULTS OF NOISECHECK ANALYSES

INTRODUCTION TO THE McCHORD AFB SENSITIVITY STUDY

The sensitivity of NOISEMAP predictions to variations in airbase operational profile modeling is fairly well understood in theory. For instance, small variations in power setting can cause significant changes in the DNL contours wherever the aircraft under consideration is the dominant noise producing operation. This report demonstrates how the detailed effects of modeling aircraft performance and flight track locations must be accommodated in an Airbase Operational Profiles (AOP) Model to obtain defensible predicted noise contours.

The McChord AFB aircraft operations and multi-site measured noise database was collected from 7/79 through 3/80 by MAN-Acoustics & Noise Inc. This database provides the best currently available source of data to test the validity of a basewide predicted noise model. A three week period from 11-29 February 1980 was selected for detailed analysis, and will be referred to as the McChord Sensitivity Study (MCSS) database in this report.

Four noise measurement sites were active during the time frame under study. These sites give considerable information on aircraft noise exposure immediately after takeoff (Site 1), on straight-in approaches and Instrument Flight Rules (IFR) touch-and-gos (Site 9), and on Visual Flight Rules (VFR) flight patterns (Sites 7 and 8). The layout of these sites is mapped in Figure 3 below.

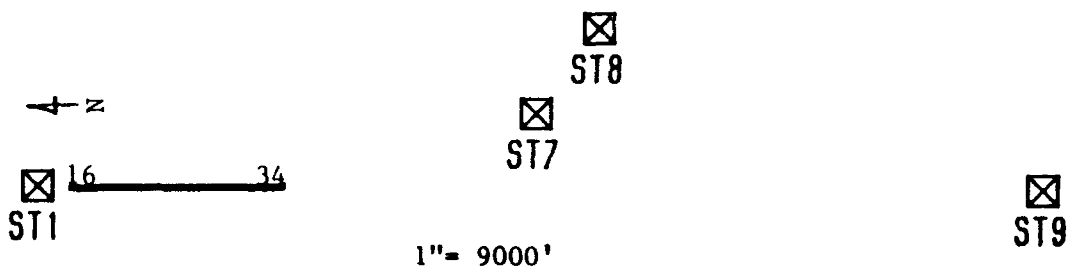


Figure 3. McChord AFB Noise Measurement Site Locations

NOTE: McChord AFB is located about three miles south of Tacoma, Washington at an elevation of 322 feet. It has one operating runway which is oriented 21.5 degrees west of magnetic north, or ~1 degree west of true north. The runway description is based on labeling the ends by their magnetic heading divided by ten. The four sites are defined to be at the locations planned by MAN-Acoustics for the noise measurement survey. Site 1 is located 1500 feet north of the end of runway 34, on the

runway centerline. Site 7 is located 12000 feet south of the end of runway 16 and 3500 feet east of the runway centerline. Site 8 is located 15000 feet south of the end of runway 16 and 7500 feet east of the runway centerline. Site 9 is located 36000 feet south of the end of runway 16 on the runway centerline.

This study will use a capability of NOISEMAP 6.0 (Ref. 1) to produce a file containing an ordered list of the predicted noise contributing aircraft operations at specified ground locations. The Specific Point Output (*.SPO) file makes it feasible to efficiently generate the detailed information necessary to conduct a thorough comparison of predicted noise levels with measured noise data collected simultaneously at several sites.

This report embodies an assessment of various AOP models used for McChord AFB operations and is the end product of an effort undertaken in three phases:

Phase 1- Evaluation of requirements to verify NOISEMAP predicted noise levels using the original MANAcoustics operations model data.

Phase 2- Development of an automated NOISECHECK analysis capability using a commercial applications program with integrated database management and spreadsheet analysis systems.

Phase 3- Application of the NOISECHECK methodology to assess revisions of the AOP model for consistency with noise measurements at four sites (1, 7, 8 and 9), to iteratively improve the AOP model and to interpret the MCSS database.

The first phase involved a detailed examination of the MCSS database at Sites 1 and 8 (Figure 3). The original intent was to generate a defensible validation of the NOISEMAP methodology and the attendant procedures used to model the aircraft operations. This was not possible since the information collected on actual performance characteristics was insufficient for the noisiest aircraft operations during the noise measurement period. However, the log of aircraft operations and the measured noise database, after having been carefully screened for errors, do provide a good basis for assessing the factors involved in modeling aircraft operations and their resultant noise.

The second phase involved the development of a variety of Enable based tools to facilitate repeated analyses of the MCSS database and to make various operational model comparisons. The procedures used are entirely based on the Air Force NOISECHECK methodology (Ref. 2, 3 and 17). The NOISECHECK analysis computes the Probability of Consistency (PoC) as a single number metric describing the degree of agreement between the predicted and measured noise exposure

at a given ground location. An explanation of the implementation of the procedures required to compute the PoC is in Appendix A.

The third phase involved several different ^SEL analyses of the MCSS database and many comparisons of the measured noise data to various AOP model SEL predictions. The SEL comparison technique revealed exactly which aircraft operations had been poorly modeled. The DNL and SEL comparisons thus formed the basis for repeated modification of the AOP model input to BASEOPS. The various model results provide the quantitive basis for analysis of the effects on predicted noise levels due to variations in the operational and meteorological variables. These acoustic modeling effects are discussed on pages 33 through 68.

Approach to Extracting Technical Information

The technical information which was extracted from the MCSS database required repetitive application of the NOISECHECK methodology. A systematic approach to address the problems inherent in any AOP modeling effort was planned. The end result was an AOP model having a very high PoC, and accurate predictions of all important SELs. The accuracy of detailed SEL predictions was crucial to obtaining valuable technical feedback, as well as being important in long-term operations planning (see pg 3). The documentation of technical changes required to achieve this result were analyzed to provide a quantifiable assessment of the important aspects of AOP modeling. Two objectives were defined to extract the maximum value from this study, and a systematic appoach was planned.

The primary objective of this effort was to quantify the dependance of noise level predictions at real airbase ground locations on the parameters used in describing the airbase operations model. These parameters include the meteorological and aircraft operational variables which describe the airbase environment and the dominant noise contributing operations. The PoC is used as an objective measure of the accuracy of the overall airbase operations model. Predicted and measured SELs were compared for all important noise producing operations at all four sites, and the results used to quantify improvements in the operations model.

A secondary objective was to automate the analysis of measured noise data and the calculations involved in comparisons to predicted values. The MCSS operational log and measured noise database, data management procedures, and spreadsheet computations were designed to handle the relevant information in the most generic fashion possible. The improved capability successfully reduced the effort required to derive numerical comparisons, and provided

valuable experience in the automated implementation of the NOISECHECK methodology.

The systematic approach used in this study involved four major successive revisions of the airbase operations model and log in steps intended to document the significant complicating factors which must be considered in the construction of the AOP model. The goal of achieving accurate SEL predictions for all dominant noise-producing operations required that all types of phenomenological problems be addressed. Problems which have a broad impact on the AOP model were dealt with first, then various types of operational profiling problems were addressed as they became evident. Repetitive changes to the AOP model were made, and careful examination of the individual SEL predictions was used to discern the need for further changes. The four McChord AFB Sensitivity Study Airbase Operational Profiles (MCS#) Model versions are:

a. MCS1 - This AOP Model was generated from data recorded by MAN-Acoustics & Noise Inc. in 1980, during an effort to conduct a field validation of NOISEMAP at McChord AFB. The 1980 AOP model was intended for use with NOISEMAP 4. It was converted in this study to the BASEOPS file format used by NOISEMAP 6.0. The MCS1 AOP model includes aircraft operational profile data which are only slightly different from that used in the MAN-Acoustics model. The effective number of operations per day was adjusted (for the top 18 predicted noise contributing operations groups) to agree with equivalent numbers derived from the observed data. Closed flight track pattern operations were formerly modelled with two profiles (representing the initial and final halves of the pattern) in the 1980 AOP Model, but have been converted to a model with just one profile. The takeoff profiles to closed flight tracks were assumed to level off at the cruise altitude typical of flyby operations. The typifying weather derived by MAN-Acoustics for their January-March measurement period were used.

An ^SEL analysis of the MCSS operational log and measured noise database was performed for Site 1 using the operations grouping originally developed by MAN-Acoustics and Noise Inc.

b. MCS2 - The MCS1 model was extensively rewritten. The January-March weather parameters were changed to reflect that typifying the 11-29 February measurement period. Aircraft operational profiles obtained from a similar Norton AFB study were substituted for the top 18 noise contributing operations at Site 1. All profiles were renamed in accordance with a simple code used to describe aircraft operations (see Table 4 and pg 30). Many transient (or infrequent) aircraft operations were regrouped to better reflect similar noise characteristics. The MCS2 model was

compared to measured average noise data from Site 1 in accordance with the new aircraft grouping. The MCS2 model was again compared to measured average noise data from all four sites, including a proper accounting of noise recorded during landings from closed pattern operations and the (revised) missed approach type operation.

The MCSS database was automatically reanalyzed twice during this developmental step to derive the ^SEL for each operational type. The first analysis of Site 1 operational and noise data accommodated the regrouping of aircraft operations and revised log codes to denote closed pattern landing operations. The Site 7 and 9 measured noise data were then collated with the existing operational log and measured noise database. It was evident that a missed approach (MA) operational code had to be included in operational log records which account for multi-site noise correlations from Sites 1 and 9 (and Site 7 to some extent). The second analysis of the MCSS database involved all four sites and included the revised missed approach operation type.

c. MCS3 - The MCS2 AOP model was revised repeatedly by examination of the effects of performance adjustments. Several NOISECHECK DNL and SEL PoC comparisons were made at all four sites. However, only the Site 1 detailed SEL assessments were used to optimize the operational profiles influencing the noise predictions at that location. Some marginal benefit from this effort was realized at other sites by copying optimized performance profiles to the aircraft operations conducted in the opposite direction. It was evident that some substantial revision of the assigned flight tracks was necessary before the operational profiles having an effect on the other three sites could be optimized.

d. MCS4 - The MCS3 AOP model was revised to include new flight tracks required to reflect multi-site noise correlations at Sites 1 and 9. These included flight tracks for missed approaches and straight-through flybys and touch-and-gos. Existing closed pattern flight tracks were moved to account for noise level differences between Sites 7 and 8. Landing profiles from closed tracks were added to accommodate the multi-site noise correlations they produced. Additional performance adjustments were made for aircraft operations which influence predicted overall noise levels at Sites 7, 8 and 9.

The MCSS database was again revised to distinguish the straight-through flybys and touch-and-gos, and correct several minor problems as mentioned on page 66. A revised ^SEL analysis was conducted for final comparison to the predicted noise exposure models.

The MCSS database was searched in a final effort to extract information on noise events from undocumented aircraft operations and for time periods in which noise monitors at Sites 7 and 9 were not operating correctly. The information resulting from this analysis was accounted for in the relevant NOISECHECK computations and discussed starting on page 69.

Table 4. The Aircraft, Operation, Runway, Track (AORT) Codification Scheme used to Label Logged Operations Records and in Profile Names

```
AORT
||||_Track (A,B,..) assigned tracks as in Figure 6
|||_Runway (N=34, S=16)
||___Operation = | F=Flyby
|                | G=Touch and Go
|                | L=Landing
|                | M=Missed Approach
|                | T=Takeoff
|____Aircraft =  | 1=C-141
     Group       | 2=F-106 +(F-101, F-4, A-6, A-4)
                 | 3=T-33 +(T-37, T-39)
                 | 4=C-130
                 | 5=F-15 +(F-14)
                 | 6=C-135A
                 | 7=C-9 +(others)
                 | 8=C-130 +(P-3, L-188, L-382, C-118)
                 | 9=F-5 +(T-38, others)
```

THE NOISECHECK ANALYTICAL METHODS

The NOISECHECK analyses (Ref. 2, 3 and 17) allow comparisons at a specified site of measured noise data which evaluate either the NOISEMAP overall DNL prediction or the cumulative effects of the SEL predictions for important noise producing aircraft operations. The DNL comparison is a quick analysis, but gives no clear indication of which aircraft's operational modeling is responsible for discrepancies.

The DNL comparison is based on an analysis of daily measured DNLs. The daily measured DNLs are adjusted to remove the accumulated background noise, and normalized to the NOISEMAP "average busy day" effective number of operations. An acoustic energy averaged DNL for the measurement period, and its measured standard deviation, are calculated. A measurement confidence interval is calculated to indicate the amount that the average DNL may be in error, given the limited number of measurement days in the study. An estimate of the standard deviation of NOISEMAP DNL energy is derived from the operational profiles of the top 18 predicted noise contributing operations. The DNL Probability of Consistency (DNL PoC) is calculated via a standard statistical analysis formulation which compares predicted vs. measured DNL energies with respect to their standard deviations.

The SEL comparison depends on the energy averaged SEL (^SEL) analysis, requiring the interpretation of detailed records of numerous events for all dominant noise-producing aircraft operations. A complete log of all aircraft operations which occurred during the measurement period is obtained (including flyby and touch-and-go operations). The continuous chronological recording of measured noise events is then collated with the operational log for each site being studied. This involves correlating each measured noise event with a logged operation, if possible, based on the time the event occurred and knowledge of the operational flight track.

The database is then (automatically) sorted by operation type, and each operation type's ^SEL (SEL_i) is calculated. The NOISEMAP effective number of movements per operation type is used to compute each operation type's contribution to the total DNL (the partial DNL per operation type). The partial DNLs are rank ordered, and the top 18 measured noise contributing partial DNLs are accumulated by energy addition to arrive at a DNL synthesized from ^SELs. The standard deviation of noise energies for the top 18 measured noise contributing operations is summed to arrive at the measured standard deviation of DNL energy. The ^SEL confidence intervals are calculated to indicate the operation types which have highly reliable measurements. A computed DNL is accumulated from the NOISEMAP predicted top 18 partial DNLs.

An estimate of standard deviation of NOISEMAP DNL energy is again computed. The SEL Probability of Consistency (SEL PoC) is calculated via the same statistical analysis formulation used in the DNL comparison. The flow of information which is required by these computations was streamlined in the automated analysis approach used in this study. A "roadmap" of the overall NOISECHECK process using the convenience of database and spreadsheet organization is shown in Figure 4.

Throughout the NOISECHECK comparative analyses, the NOISEMAP "yearly averaged busy day" effective number of operations is normally used. However, all the yearly averaged airbase operational models relevant to McChord AFB in 1980 contained operational groupings unusable in this study. For this reason, the NOISEMAP effective number of operations used in the foregoing analyses were reconstructed from the actual measured noise database. This allowed a totally objective comparison of a short-term averaged airbase operations model to the logged operational database from which the numbers of operations were derived. The airbase operational model's individual noise contributing profiles were then evaluated separately. With BASEOPS, it would then be a simple matter to change the effective number of operations per operation type to the usual set of yearly averaged values.

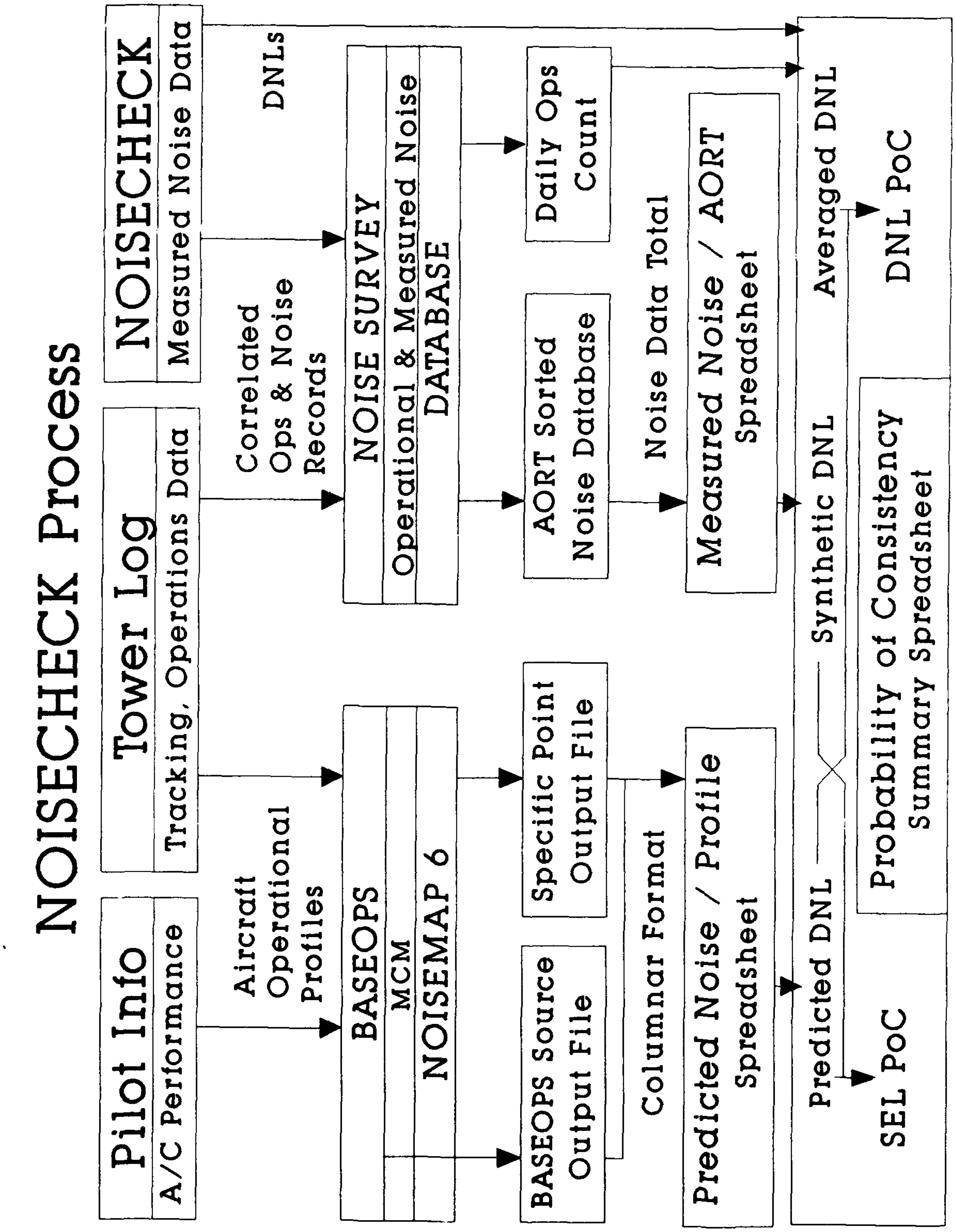


Figure 4. The NOISECHECK Process Diagram

Fulfillment of the DNL Comparison

The standard approach to computing the normalized measured energy-averaged DNL could not be used based on the information available in the McChord Sensitivity Study (MCSS) database. The operations log available from the original McChord noise measurement study did not include vital data before 0800 and after 2000 hours. This necessitated calculation of the DNL (Eq. 1.1, Table 5) using an accumulation of 12 hours of measured Hourly Noise Levels (HNLs) plus 12 hours of estimated background noise levels. The HNLs were also set to the estimated background noise level for the periods during which the site's noise monitor was not functioning, see Tables 6B, D, F and H. Throughout the remainder of this report, this calculated DNL will be referred to as the measured DNL for each day.

Each day's measured DNL is first adjusted (Eq. 1.2) to remove the effects of cumulative background noise. The noisiness of minor noise contributing operations and unknown noise sources cannot be included in this adjustment, but will be discussed (pg 76) in comparison to the DNL predictions resulting from an accurate operational model. For this study, the estimated background levels are based on observation of the measured nighttime HNLs. The background noise was estimated to be 50 dB near Site 1, 30 dB near Site 8, and 35 dB at Sites 7 and 9. The background noise corrections to daily measured DNLs were at most 0.1 dB, except the 11 February measurement at Site 9. This day's DNL was corrected by 0.4 dB since it included only two hours of noise measurements (Tables 6A through H).

Normally a NOISECHECK survey would also require that the average busy day effective number of operations (N_{NM}) be used, which is the average of the total of the daytime plus ten times the nighttime (2200<T<0700) numbers of operations, for all busy days during the year. For the purposes of this study, N_{NM} was equal to the short-term average effective number of operations, which is the average total number of operations logged during the 0800-2000 hrs time frame, for the 15 days of the study (117 operations). McChord AFB was noisy even on Saturdays, but the noise data again could not be analyzed for lack of operational data. The actual number of operations during the 12 hour time frame ($N_F(n)$) for each day was used to normalize that day's DNL to N_{NM}. Each day's measured DNL, less the background noise contribution, was adjusted by the normalization factor for the number of operations (Eq. 1.3). Several lapses in data collection at Sites 7 and 9 required additional corrections to the affected daily operational counts, or "Measured Noise Data Corrections", page 69.

The normalized measured energy averaged DNL (DNL_m, Eq. 1.4) and the measured [sample] standard deviation of DNL energy

($Sigma_m$, Eq. 1.5) were then computed for the whole measurement period, and the results used in the DNL PoC calculation. The DNL_m confidence interval was calculated (c.i.(DNL_m), Eq. 1.6), to reflect the adequacy of the number of noise measurements collected. All equations used in the DNL_m and DNL PoC computations are included in Table 5. The results of the DNL_m calculations are documented in Tables 6A, C, E and G. The foregoing adjustments were implemented by simple spreadsheet calculations as discussed in Appendix A (pg A-6).

The PoC calculation also requires computation of an estimate of the predicted [sample] standard deviation of NOISEMAP DNL energy ($Sigma_c$, Eq. 1.7). This computation is dependant on information provided for each Airbase Operational Profiles (AOP) model's results in the Specific Point Output file generated by NOISEMAP. This file contains the predicted overall DNL and the SEL, Slant Distance, and Elevation Angle for each of the top 18 predicted noise contributing operations at each site. The Slant Distance and Elevation Angle are used by the NOISECHECK Variance nomograph (Figure 5, from Ref. 17, Fig. 17) to determine the estimated variance included in the computation of $Sigma_c$. The confidence intervals for the DNL_c (Eq. 1.8) and the DNL PoC were calculated (Eq. 1.9) using summary spreadsheets (POCS#.SSF). The spreadsheets calculate the $Sigma_m$ and $\hat{DNL}_m$ as soon as the HNL data are entered. The $Sigma_c$ and the DNL PoC were computed later during the comparative analysis.

A batch command file initiating a BASIC program and Enable macros were designed to automate this process. These tools reformatted and transferred the relevant data from the NOISEMAP Specific Point Output file to Enable spreadsheets for computing the Probability of Consistency. Since SELs for the top 18 predicted noise contributing operations are also used in the SEL PoC comparison to compute a synthesized DNL and $Sigma_c$, it was convenient to perform both the DNL and SEL PoC comparisons within the same spreadsheet. Further discussion of the implementation of the automated process used in this study is in Appendix A (pg A-5), with listings of the programs and macros given in Appendix A (pg A-9).

Table 5. **NOISECHECK DNL Analysis and Comparison Equations**

{1.1} $$DNL = 10 \cdot \text{Log}\left[\sum_{h=1}^{24} 10^{[HNL(\text{h in DAY}) \text{ or } HNL(\text{h in NIGHT})+10]/10} / 24 \right]$$

where the nighttime hours have been penalized by 10 dB

{1.2} $$DNL' = 10 \cdot \text{Log}[10^{DNL/10} - 10^{DNL_{BG}/10}]$$

{1.3} $$DNL_n = DNL' - 10 \cdot \text{Log}\left[\frac{N_F(n)}{N_{NM}} \right]$$

$$\text{where} \quad N_F(n) = \sum_{i=1}^{\infty} N_i(n) \quad \text{and} \quad N_{NM} = \sum_{j=1}^{\infty} N_j$$

{1.4} $$DNL_m = 10 \cdot \text{Log}\left[\frac{1}{m} \sum_{n=1}^{m} 10^{DNL_n/10} \right]$$

{1.5} $$\sigma_m = \sqrt{\frac{1}{m-1} \left\{ \sum_{n=1}^{m} (10^{DNL_n/10})^2 - (\sum_{n=1}^{m} 10^{DNL_n/10})^2 / m \right\}}$$

{1.6} $$c.i.(DNL_m) = 10 \cdot \text{Log}\left(10^{DNL_m/10} \pm z_c \sigma_m / \sqrt{m} \right)$$

$$\text{where} \quad z_c = 1.645 \ \text{for} \ 90\% c.i. \ \text{or} \ z_c = 1.960 \ \text{for} \ 95\% c.i.$$

{1.7} $$\sigma_c = \frac{1}{86400} \sqrt{\sum_{j=1}^{l} (N_j \sigma_j)^2} \qquad \text{with} \quad l = 18$$

$$\text{where} \quad \sigma_j = \left[10^{(SEL_j + \sqrt{V})/10} - 10^{SEL_j/10} \right]$$

and V *is the Variance from Figure 5*

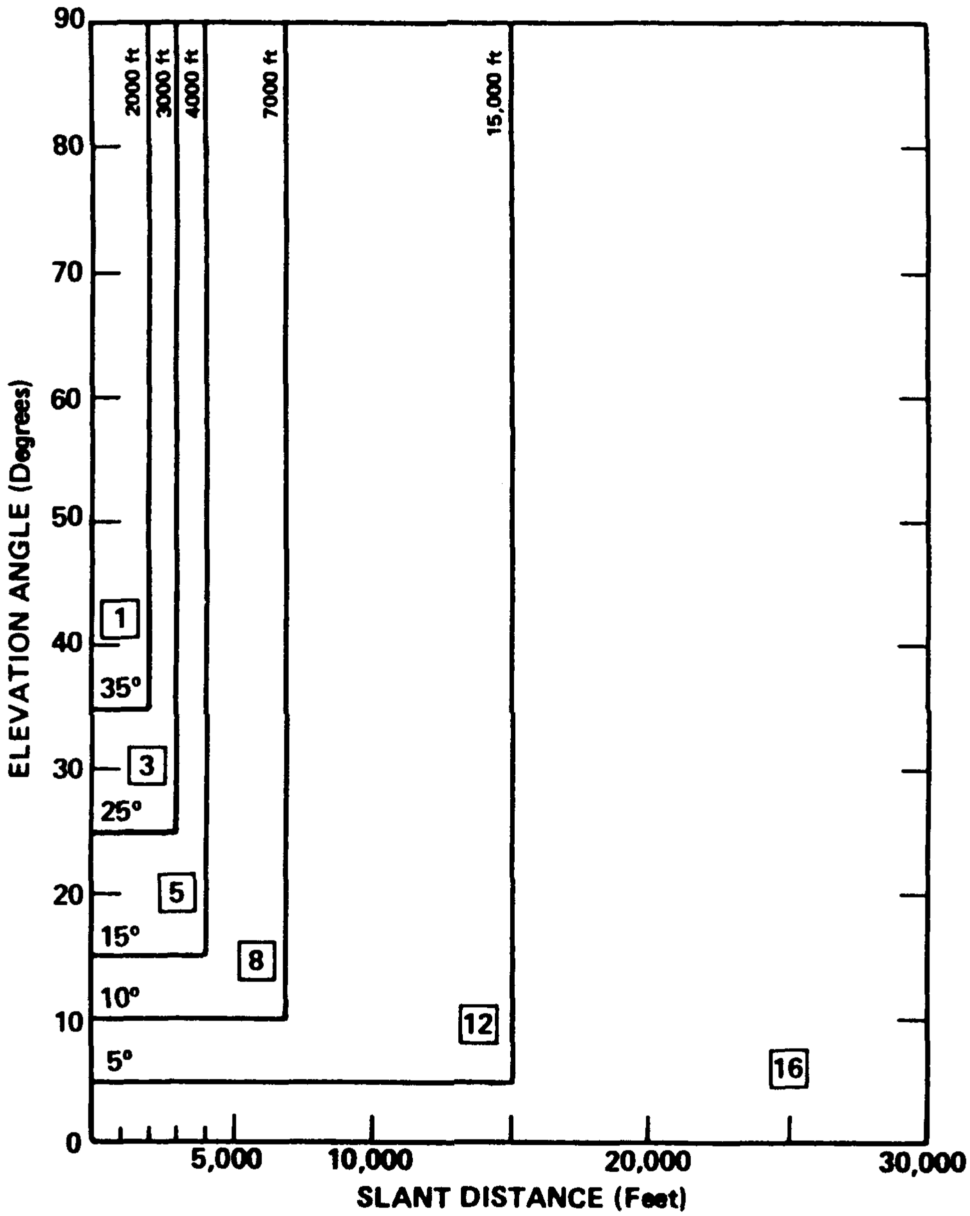
{1.8} $$c.i.(DNL_c) = 10 \cdot \text{Log}\left(10^{DNL_c/10} \pm z_c \sigma_c / \sqrt{l} \right); \quad z_c = 1.645$$

{1.9} $$DNL \ \ PoC = 2 - 2p(z)$$

where $p(z)$ *is defined in Eq. {2.8}*

$$\text{and} \qquad z(DNL) = \frac{\left| 10^{DNL_c/10} - 10^{DNL_m/10} \right|}{\sqrt{\sigma_c^2 + \sigma_m^2}}$$

with DNL_c *predicted by* NOISEMAP



☐ = V, Variance in dB

Figure 5. The NOISECHECK Estimate of NOISEMAP Predicted SEL Variance Nomograph (AFAMRL-TR-80-45, Fig. 17)

Table 6A. Measured Energy Averaged DNL Computation, Site 1

N_{NM}=117	Eq. #:		1.1		1.2		1.3	1.3
			Meas	Est.			DNL	
	Qty:	Date	DNL	DNL_{BG}	DNL'	$N_F(n)$	Adj.	DNL_n
		2/11	76.6	50	76.5	92	1.0	77.6
		2/12	73.2	50	73.2	61	2.8	76.0
		2/13	76.2	50	76.2	98	0.8	77.0
		2/14	74.6	50	74.6	75	1.9	76.5
		2/15	69.4	50	69.3	71	2.2	71.5
		2/18	75.8	50	75.7	30	5.9	81.7
		2/19	78.9	50	78.9	196	-2.2	76.7
		2/20	79.3	50	79.3	175	-1.7	77.5
		2/21	79.7	50	79.7	138	-0.7	79.0
		2/22	76.9	50	76.9	115	0.1	77.0
		2/25	78.3	50	78.3	94	1.0	79.3
		2/26	82.8	50	82.8	152	-1.1	81.7
		2/27	80.1	50	80.1	132	-0.5	79.6
		2/28	82.6	50	82.6	211	-2.6	80.1
		2/29	81.0	50	81.0	115	0.1	81.0

Table 6B. Measured HNLs from Site 1

Date:	2/11	2/12	2/13	2/14	2/15	2/18	2/19	2/20
DNL=	76.6	73.2	76.2	74.6	69.4	75.8	78.9	79.3
Hour								
0800-0900	71.9	68.6	74.4	81.3	67.8	86.3	76.9	84.4
0900-1000	73.5	57.7	81.3	79.3	59.3	74.2	87.4	86.7
1000-1100	76.4	56.3	72.3	83.7	54.9	76.1	71.0	73.0
1100-1200	82.8	63.3	60.9	77.5	52.1	74.5	84.3	70.0
1200-1300	84.0	76.2	77.9	71.0	53.7	77.3	81.6	79.9
1300-1400	79.7	78.6	85.0	75.4	68.7	84.0	80.2	85.5
1400-1500	85.1	85.3	81.2	73.5	54.3	78.0	78.9	79.1
1500-1600	75.5	70.5	73.4	70.8	55.6	57.9	83.6	83.9
1600-1700	79.4	71.8	83.3	76.9	82.3	60.0	75.3	71.2
1700-1800	70.7	59.4	58.1	76.7	67.1	60.1	82.0	69.2
1800-1900	59.5	60.1	74.1	48.3	71.7	60.1	82.0	83.1
1900-2000	58.6	56.3	75.9	47.4	58.3	57.4	79.3	83.8
2000-0800	50.0	50.0	50.0	50.0	45.0	50.0	50.0	50.0

Table 6B, continued

Date:	2/21	2/22	2/25	2/26	2/27	2/28	2/29
DNL=	79.7	76.9	78.3	82 8	80.1	82.6	81.0
Hour							
0800-0900	74.0	57.0	82.1	83.6	85.9	84.9	88.0
0900-1000	79.2	69.4	78.4	87.2	86.6	84.0	83.9
1000-1100	87.0	70.5	85.3	84.4	83.3	89.6	80.5
1100-1200	81.0	72.3	60.2	70.8	81.0	86.2	84.7
1200-1300	84.3	82.7	80.2	89.6	87.0	88.8	75.4
1300-1400	76.9	85.6	82.3	86.1	81.7	77.8	77.4
1400-1500	87.7	78.1	79.5	85.7	81.4	85.3	87.9
1500-1600	75.9	82.4	85.4	88.0	85.3	82.7	64.6
1600-1700	85.3	70.8	66.4	83.5	75.0	86.0	87.4
1700-1800	82.4	74.0	61.6	82.6	80.7	83.5	85.8
1800-1900	75.5	80.4	81.8	81.3	59.7	85.8	77.1
1900-2000	67.9	83.1	82.7	88.2	56.9	82.3	73.5
2000-0800	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Table 6C. Measured Energy Averaged DNL Computation, Site 7

	Eq. #:		1.1		1.2		1.3	1.3
N_{NM}=117			Meas	Est.			DNL	
	Qty:	Date	DNL	DNL_{BG}	DNL'	$N_F(n)$	Adj.	DNL_n
		2/11	53.4	35	53.3	92	1.0	54.4
		2/12	53.0	35	53.0	61	2.8	55.8
		2/13	55.1	35	55.0	98	0.8	55.8
		2/14	55.8	35	55.8	75	1.9	57.7
		2/15	51.2	35	51.1	71	2.2	53.3
		2/18	55.5	35	55.5	30	5.9	61.4
		2/19	58.3	35	58.3	196	-2.2	56.1
		2/20	59.9	35	59.9	175	-1.7	58.1
		2/21	55.6	35	55.6	138	-0.7	54.9
		2/22	58.0	35	58.0	115	0.1	58.0
		2/25	55.0	35	55.0	94	1.0	55.9
		2/26	59.9	35	59.9	152	-1.1	58.8
		2/27	58.2	35	58.2	132	-0.5	57.7
		2/28	63.9	35	63.9	211	-2.6	61.3
		2/29	54.7	35	54.6	115	0.1	54.7

Table 6D. Measured HNLs from Site 7

Date:	2/11	2/12	2/13	2/14	2/15	2/18	2/19	2/20
DNL=	53.4	53.0	55.1	55.8	51.2	55.5	58.3	59.9
Hour								
0800-0900	43.3	50.4	59.9	54.9	35.0	50.4	56.6	64.3
0900-1000	48.1	53.0	58.8	67.8	35.0	66.9	59.3	62.4
1000-1100	47.9	59.2	43.9	51.7	35.0	57.0	58.9	51.1
1100-1200	41.1	51.2	50.1	53.8	35.0	56.7	63.0	59.0
1200-1300	55.3	55.1	56.1	49.7	57.6	46.8	57.6	56.1
1300-1400	51.3	56.7	55.4	58.4	57.0	54.7	64.3	64.9
1400-1500	61.3	56.3	54.8	54.7	52.0	45.8	58.4	58.8
1500-1600	59.1	60.0	60.4	50.6	49.1	43.1	64.9	69.9
1600-1700	62.9	59.2	63.8	58.6	58.3	53.4	58.0	35.0
1700-1800	49.0	52.2	51.9	53.3	55.0	46.9	61.3	35.0
1800-1900	49.1	43.0	56.3	45.9	54.0	43.9	62.1	63.1
1900-2000	47.0	42.1	55.9	38.0	55.1	62.1	61.4	62.5
2000-0800	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

Date:	2/21	2/22	2/25	2/26	2/27	2/28	2/29
DNL=	55.6	58.0	55.0	59.9	58.2	63.9	54.7
Hour							
0800-0900	35.0	58.4	65.0	59.5	60.1	61.7	49.6
0900-1000	35.0	48.2	62.3	68.7	56.8	67.2	60.8
1000-1100	35.0	50.1	49.6	62.5	56.1	63.7	56.4
1100-1200	35.0	59.4	46.4	63.1	53.6	66.3	50.2
1200-1300	35.0	56.3	61.1	65.3	54.9	61.2	51.6
1300-1400	35.0	60.3	58.0	59.1	67.1	68.4	57.7
1400-1500	35.0	49.5	56.3	59.8	64.1	70.6	50.3
1500-1600	35.0	67.2	35.0	59.7	67.4	63.5	54.0
1600-1700	67.4	49.7	35.0	35.0	35.0	71.6	57.8
1700-1800	64.1	54.4	35.0	54.9	35.0	63.2	64.9
1800-1900	54.3	64.7	35.0	65.9	35.0	65.9	47.9
1900-2000	50.8	64.7	35.0	58.9	43.2	64.8	50.1
2000-0800	35.0	35.0	35.0	35.0	35.0	35.0	35.0

Table 6E. Measured Energy Averaged DNL Computation, Site 8

N_{NM}=117

Eq. #:		1.1		1.2		1.3	1.3
		Meas	Est.			DNL	
Qty:	Date	DNL	DNL_{BG}	DNL'	$N_F(n)$	Adj.	DNL_n
	2/11	56.6	30	56.6	92	1.0	57.7
	2/12	47.6	30	47.5	61	2.8	50.3
	2/13	50.6	30	50.6	98	0.8	51.4
	2/14	52.9	30	52.9	75	1.9	54.8
	2/15	49.4	30	49.3	71	2.2	51.5
	2/18	49.9	30	49.9	30	5.9	55.8
	2/19	54.1	30	54.1	196	-2.2	51.8
	2/20	58.7	30	58.7	175	-1.7	57.0
	2/21	58.5	30	58.5	138	-0.7	57.8
	2/22	54.3	30	54.3	115	0.1	54.4
	2/25	51.5	30	51.5	94	1.0	52.4
	2/26	57.4	30	57.4	152	-1.1	56.2
	2/27	52.9	30	52.9	132	-0.5	52.4
	2/28	58.9	30	58.9	211	-2.6	56.4
	2/29	51.0	30	51.0	115	0.1	51.1

Table 6F. Measured HNLs from Site 8

Date:	2/11	2/12	2/13	2/14	2/15	2/18	2/19	2/20
DNL=	56.6	47.6	50.6	52.9	49.4	49.9	54.1	58.7
Hour								
0800-0900	41.8	45.6	49.1	51.6	45.7	49.0	51.9	63.3
0900-1000	43.5	35.0	51.9	65.4	47.7	59.0	52.8	58.8
1000-1100	42.4	42.3	44.1	55.2	50.9	54.0	54.9	50.5
1100-1200	41.4	40.4	44.0	48.6	51.5	53.0	58.2	53.7
1200-1300	49.5	49.1	48.8	47.0	53.0	44.1	52.3	49.3
1300-1400	56.3	50.8	53.2	47.8	50.5	52.7	59.1	57.4
1400-1500	61.9	51.3	52.5	43.0	46.6	46.3	53.1	54.2
1500-1600	68.7	56.0	54.7	47.3	44.0	44.7	62.1	70.9
1600-1700	61.2	56.1	61.1	55.1	56.8	51.6	56.9	48.9
1700-1800	47.8	46.1	51.1	48.2	49.1	44.1	55.2	53.7
1800-1900	45.5	42.7	51.4	42.0	57.0	44.1	57.1	59.1
1900-2000	43.7	40.7	49.1	33.9	52.6	56.7	57.7	53.4
2000-0800	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Table 6F, continued

Date:	2/21	2/22	2/25	2/26	2/27	2/28	2/29
DNL=	58.5	54.3	51.5	57.4	52.9	58.9	51.0
Hour							
0800-0900	40.3	51.9	57.9	58.5	55.2	57.9	47.7
0900-1000	46.8	43.3	61.5	61.5	50.1	59.1	53.1
1000-1100	55.0	44.3	49.4	59.7	52.3	55.8	51.2
1100-1200	52.1	54.5	49.1	56.4	53.9	55.8	49.8
1200-1300	67.7	53.8	54.4	62.7	53.6	57.1	47.3
1300-1400	54.2	62.1	50.2	55.9	53.6	64.3	54.9
1400-1500	49.7	46.3	51.3	64.0	59.7	65.5	44.4
1500-1600	56.1	61.2	51.7	54.2	61.7	58.0	48.5
1600-1700	66.6	50.4	51.2	59.0	55.8	67.5	54.1
1700-1800	67.1	54.1	49.4	54.7	54.9	60.7	62.1
1800-1900	49.4	62.9	49.2	51.9	52.4	61.1	47.4
1900-2000	48.1	55.9	50.8	65.1	46.1	59.8	47.3
2000-0800	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Table 6G. Measured Energy Averaged DNL Computation, Site 9

	Eq. #:		1.1		1.2		1.3	1.3
N_{NM}=117			Meas	Est.			DNL	
	Qty:	Date	DNL	DNL_{BG}	DNL'	$N_F(n)$	Adj.	DNL_n
		2/11	46.1	35	45.7	92	1.0	46.8
		2/12	56.3	35	56.3	61	2.8	59.1
		2/13	61.0	35	61.0	98	0.8	61.8
		2/14	58.6	35	58.6	75	1.9	60.5
		2/15	59.2	35	59.2	71	2.2	61.4
		2/18	53.6	35	53.5	30	5.9	59.5
		2/19	63.6	35	63.6	196	-2.2	61.4
		2/20	62.1	35	62.1	175	-1.7	60.4
		2/21	59.2	35	59.2	138	-0.7	58.5
		2/22	59.3	35	59.3	115	0.1	59.4
		2/25	62.1	35	62.1	94	1.0	63.0
		2/26	63.8	35	63.8	152	-1.1	62.7
		2/27	62.9	35	62.9	132	-0.5	62.3
		2/28	62.2	35	62.2	211	-2.6	59.6
		2/29	54.5	35	54.4	115	0.1	54.5

Table 6H. Measured HNLs from Site 9

Date:	2/11	2/12	2/13	2/14	2/15	2/18	2/19	2/20
DNL=	46.1	56.3	61.0	58.6	59.2	53.6	63.6	62.1
Hour								
0800-0900	35.0	56.8	63.7	61.1	59.5	42.9	64.9	63.7
0900-1000	35.0	55.3	68.6	64.9	62.4	59.8	66.5	65.9
1000-1100	35.0	56.6	49.6	59.6	59.7	56.3	57.9	57.7
1100-1200	35.0	57.2	61.7	61.6	62.8	52.7	67.1	48.4
1200-1300	35.0	59.2	62.0	44.9	57.9	43.8	65.2	66.1
1300-1400	35.0	60.7	61.4	61.5	61.2	62.7	66.5	70.1
1400-1500	35.0	56.8	57.4	50.6	62.2	42.1	67.5	66.4
1500-1600	35.0	63.0	66.0	59.2	47.6	44.7	68.3	67.9
1600-1700	35.0	65.2	65.8	66.9	67.7	61.5	59.0	58.5
1700-1800	35.0	54.1	59.9	63.9	62.6	38.9	65.0	63.3
1800-1900	58.0	41.3	62.6	57.9	64.4	46.2	68.4	61.0
1900-2000	42.7	46.7	66.9	36.4	53.2	53.6	70.2	65.1
2000-0800	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

Date:	2/21	2/22	2/25	2/26	2/27	2/28	2/29
DNL=	59.2	59.3	62.1	63.8	62.9	62.2	54.5
Hour							
0800-0900	41.5	52.3	66.8	62.5	68.0	67.4	35.0
0900-1000	51.3	58.9	62.7	68.6	63.0	67.1	35.0
1000-1100	49.7	57.3	61.6	68.1	67.2	69.0	35.0
1100-1200	60.4	61.6	56.5	67.8	65.0	64.9	35.0
1200-1300	65.0	62.4	68.5	54.4	66.2	65.1	35.0
1300-1400	61.6	61.7	67.1	67.5	67.1	63.1	35.0
1400-1500	63.1	59.7	66.0	67.9	65.8	62.9	35.0
1500-1600	62.5	65.0	67.6	67.3	68.0	65.3	60.6
1600-1700	65.2	54.1	64.9	65.0	66.7	64.2	62.6
1700-1800	67.1	57.1	54.8	67.8	66.3	59.2	64.0
1800-1900	60.1	60.0	58.4	67.5	59.8	60.6	51.2
1900-2000	56.9	69.1	65.9	65.5	47.1	64.1	59.1
2000-0800	35.0	35.0	35.0	35.0	35.0	35.0	35.0

Fulfillment of the SEL Comparison

A process was initiated to automatically perform the detailed SEL comparison for each developmental AOP model at the sites used in this study. The approach allowed extraction of the maximum of detailed information from the measured noise data. A database structure and summary procedure were developed to perform the required analysis of measured noise data from the MCSS database. The database contained each logged aircraft operation (aircraft, operation, runway, and track), their temporally correlated measured SELs, and other archival information. Any machine-readable record of operational and noise data which contains this information could be imported into a similar database and analyzed with this automated system. The only change needed would pertain to the step in which the aircraft operational grouping is defined by the user.

The required computation of the energy averaged Sound Exposure Level (^SEL) for each operation type (or group of types) was accomplished by analysis of the MCSS database. A simple codification scheme was applied to identify the various operations. Each logged record of an operation was assigned a four-letter operational code, abbreviated AORT (for Aircraft, Operation, Runway, Track, see Table 4 for details). The AORT code was used as a sort key during analysis of the MCSS database. The AORT code was also used for generating *profile names* in BASEOPS since the profile name encodes the operational information characterizing the profile. This also made it easier to match up the SEL predicted for each profile with the corresponding measured ^SEL (as required for Equation 2.4).

The codification of database records was carried out in several steps via three macros driven by the Enable master control macro (${9}.MCM). The implementation of this process is discussed in detail in Appendix A (pg A-3). The database was then automatically sorted based on the AORT operational code. The sorted measured noise data was then used to calculate ^SEL (Eq. 2.1) and the measured [sample] standard deviation of SEL energy per operation type ($Sigma_i$, Eq. 2.2). The actual energy-averaging calculation was implemented by use of MCSS database field definitions for energy (E_k, Eq. 2.1) and energy squared and by a macro-driven procedural language report (AVSEL#.RPT). The report's results were imported into the boilerplate PoC computation spreadsheets and then renamed (POCS#_.SSF). The revised spreadsheets were then used for comparison to various Specific Point Outputs to compute the SEL PoC (Eq. 2.8). This was accomplished simultaneously with the DNL PoC final calculation via an Enable macro (SPO.MAC).

The SEL based PoC computation is very similar to that used for the DNL analysis. The measured DNL (DNL_s, Eq. 2.4) was

synthesized from the top 18 contributing ^SELs, with the measured [sample] standard deviation of DNL_s energy, $Sigma_s$, (Eq. 2.5) replacing $Sigma_m$, and the predicted cumulative exposure, DNL_{ct}, calculated (Eq. 2.7) from only the top 18 predicted noise contributing SELs. The estimated [sample] standard deviation of the NOISEMAP DNL prediction ($Sigma_c$) is again used.

The NOISECHECK ^SEL analysis and SEL comparison equations are given in Table 7. The MCSS database structure is defined in detail and a summary of its contents given in Appendix D. The procedural language commands and macros used to perform the ^SEL analysis and comparison are listed in Appendix A (pg A-9). The PoC spreadsheets and the Specific Point Output comparison macro are discussed in Appendix A (pg A-5), with the results from each AOP model version's comparison documented in the tables in Appendix B.

The tables in Appendix B document spreadsheet records which maintained an ordered list of noise contributing operations up to the 36th ranking contributor. The full list would include ~160 noise contributing operations. The top 36 contributors were recorded so that most overpredicted SELs may be matched up with their respective measured ^SELs, and a second set of 18 predicted SELs could be included with an additional NOISEMAP run if it were ever deemed valuable (see pg 76). Operations which were predicted to be among the top 18 noise contributors, but whose actual measured ^SEL was not included in the top 36 measured noise contributors list, were not included in the computation of the DNL_{ct} and the SEL PoC. The ordered list of operations was truncated at i=35 for publication.

Table 7. **NOISECHECK SEL Analysis and Comparison Equations**

{2.1} $$\hat{}SEL = SEL_i = 10 \cdot \mathrm{Log}\left[\frac{1}{n_i}\sum_{k=1}^{n_i} 10^{SEL_k/10}\right]$$

$$where \qquad n_i = m \cdot N_i = \sum_{n=1}^{m} N_i(n)$$

$$and,\ for\ implementation, \qquad E_k = 10^{SEL_k/10}$$

{2.2} $$\sigma_i = \sqrt{\frac{1}{n_i - 1}\left\{\sum_{k=1}^{n_i}(10^{SEL_k/10})^2 - (\sum_{k=1}^{n_i} 10^{SEL_k/10})^2/n_i\right\}}$$

{2.3} $$c.i.(SEL_i) = 10 \cdot \mathrm{Log}\left(10^{SEL_i/10} \pm z_c\sigma_i/\sqrt{n_i}\right); \quad z_c = 1.645$$

{2.4} $$DNL_s = 10 \cdot \mathrm{Log}\left[\sum_{i=1}^{l} N_j|_{\mathrm{AORT}_j = \mathrm{AORT}_i} \cdot 10^{SEL_i/10}\right] - 49.4$$

{2.5} $$\sigma_s = \frac{1}{86400}\sqrt{\sum_{i=1}^{l}(N_i\sigma_i)^2} \qquad with \quad l = 18$$

{2.6} $$c.i.(DNL_s) = 10 \cdot \mathrm{Log}\left(10^{DNL_s/10} \pm z_c\sigma_s/\sqrt{l}\right); \quad z_c = 1.645$$

{2.7} $$DNL_{ct} = 10 \cdot \mathrm{Log}\left[\sum_{j=1}^{l} N_j 10^{SEL_j/10}\right] - 49.4$$

σ_c *and* $c.i.(DNL_c)$ *are given in Equations {1.7&8}*

{2.8} $$SEL \quad PoC = 2 - 2p(z)$$

$$where \qquad p(z) = 1 - R(\mathrm{a}T + \mathrm{b}T^2 + \mathrm{c}T^3)$$

$$with \quad T = \frac{1}{1 + 0.33267z} \quad ; \quad R = \frac{e^{-z^2/2}}{2.5066282746}$$

$$\mathrm{a} = 0.4361836; \quad \mathrm{b} = -0.1201676; \quad \mathrm{c} = 0.937298$$

$$and \qquad z(SEL) = \frac{\left|10^{DNL_{ct}/10} - 10^{DNL_s/10}\right|}{\sqrt{\sigma_c^2 + \sigma_s^2}}$$

AIRBASE OPERATIONS MODEL REQUIREMENTS

The overall airbase operations model input to BASEOPS contains two types of information which had a broad impact on the consistency between predicted and field measured noise data. First, the atmospheric variables used to describe the weather typifying the airbase environment to compute yearly average noise contours will not normally be representative of the measurement time frame. The temperature and relative humidity should be identified within BASEOPS to be consistent with the weather typifying the measurement period. Secondly, the method used to account for transient aircraft operations also had a broad effect on the structure and content of the operational profiles used. The MAN-Acoustics method of grouping several different aircraft operations together used one profile to model any operation, either takeoff, flyby or touch-and-go, conducted by aircraft grouped together and operating on a given flight track. Both of these problems must be dealt with prior to pursuing a NOISECHECK analysis since they may have significant impact on the noise levels predicted by the operations model.

The grouping method problem was initially compounded by the use of confusing profile names. This problem also affected the entire AOP model, and was solved by devising the AORT (Aircraft, Operation, Runway and Track) profile name code as discussed on page 30 (see Table 4). The operational groups were originally identified (see Tables B-1B and D) by a system of notation which simply numbered the profiles in the order they appeared in the original NOISEMAP 4 chronicle listing. This method revealed no information about the operations being profiled. To determine the actual aircraft operation(s) being modeled, one had to consult a BASEOPS AICUZ summary listing, such as the one given in Appendix C.

Effect of Atmospheric Variables

It is important that the NOISECHECK comparisons be unbiased by atmospheric absorption effects. This is best accomplished by deriving the typifying weather input to NOISEMAP (pg 35). NOISEMAP calculates the individual SELs (and DNL) based on the one-third octave band atmospheric absorption coefficients determined by the temperature and humidity values (Ref. 5 and 9). There is no separate weather normalization conducted in the NOISECHECK procedures to accommodate the level differences in daily DNLs due to differences in the modeled weather versus the weather recorded during the noise measurement study.

In general, for sites near the airbase (where propagation distances are less than 1000 feet), there will be only a nominal (<1 dB) change in predicted DNL due to seasonal

changes in weather. As the noise propagation distance increases, the variation in atmospheric absorption also increases. The Site 1 noise measurement location at McChord was 1500 feet from the runway, with most dominant noise contributing aircraft operations passing within 700 to 1100 feet overhead (Slant Distance). It will serve as an example of the variation in noise levels due to atmospheric absorption for relatively small (~1000 feet) propagation distances.

Several selected AOP model predictions are summarized for comparison in Table 8. Note that the MCS1 AOP model shows a superficially good DNL PoC of .83. This is an artifact of several technical errors which compensate for one another. The weather variables in the original model used an extremely low humidity, which contributed strongly to very high atmospheric absorption. By itself, the increased sound absorption would decrease the DNL somewhat. However, the dominant F-106 "takeoff" operational profile to track 34D was predicted to be 9 dB SEL higher than measured. [The measured SEL was 109 dB versus a predicted SEL of 118 dB, based on the original MAN-Acoustics aircraft operational groups, see Table B-1B.]

Using the typifying weather determined for the noise measurement period is required to get reasonable feedback on the quality of the AOP model. However, in this situation, the MCS1 model's DNL PoC decreased from .83 to only .48 (see Table B-1C). An additional parametric study was conducted using MCS4, the final version of this report's developmental AOP models. It showed that the DNL PoC increases from .60 to .91 if the appropriate weather data are used. This demonstrates that the Probability of Consistency can be strongly influenced by the weather variables input to NOISEMAP to obtain the predicted DNL.

For further discussion of the sensitivity of airbase noise contours to changes in temperature and relative humidity, see reference 5. Sound propagation is also affected by atmospheric refraction (Ref. 6), which is accommodated within the noise prediction model by the use of a standardized downwind propagation model. Changes in the operational profiles were made to accommodate the measured noise data, and were not derived from the actual operational information, as on pages 4 through 10. This fact will tend to disguise the atmospheric refraction effect, and other mechanisms, which might otherwise be evident in the comparative analysis. Anomolous measured noise data which may be explainable by this acoustic propagation mechanism are discussed starting on page 58.

Table 8. Summary of the Effects on Predicted Noise Levels at Site 1 due to Weather Variables.

	Weather Used						
	Yearly		Jan-Mar		11-29 Feb		
Typ. Weather	51F	56%	41F	46%	44F	70%	
absorption Coefficient	1.49		2.2		1.39		(dB/kft) (@ 1kHz)
	DNL	PoC	DNL	PoC	DNL	PoC	
Measured	(78.7)		(78.6)		78.8		
MCS1	80.2	.50	79.3	.83	80.3	.48	
MCS4	78.4	.88	77.3	.60	78.5	.91	

NOTE: The PoCs are all calculated with respect to the 11-29 February measured DNL. The measured DNLs given in parentheses are those cited by MAN-Acoustics, normalized to 117 effective operations per day for their respective time periods. The yearly weather shown is a close approximation of the typifying weather (54F, 59%) calculated for McChord based on the most recent (1984) Air Weather Service climatic brief.

Determining the Typifying Weather

The following is a discussion of the methodology recommended by reference 5 (pg 52) for determining the weather variables input to BASEOPS to typify the yearly average airbase environmental noise contours. The 15 dav measurement period was treated in much the same way as the (12 month) yearly period in determining typical weather values.

To determine the appropriate temperature and relative humidity values, hourly and daily weather records were obtained from those recorded by McChord AFB weather station and archived at the Environmental Technical Applications Center. Each hour during the 12 hour measurement period has a temperature and dew-point recorded in degrees Fahrenheit. The relative humidity was calculated for each hour using a simplified formula. The average daily temperature and relative humidity was then calculated and used to determine the air absorption coefficient (Ref. 9) for each day. The seventh (of fifteen) lowest absorption coefficient corresponded to a typical day's weather conditions during the measurement period. The daily averaged weather data and acoustic air absorption coefficients are documented in Table 9.

These calculations were carried out in a spreadsheet named TEMPHUM.SSF, as discussed in Appendix A (pg A-6). It used

Tetens' formula (Ref. 7) [an approximate form of the Goff-Gratch formula (Ref. 8)] to calculate vapor pressure, e, (in millibars) from the dewpoint temperature, T, in degrees Centigrade;

$$e = 6.11 * 10^{(aT/T+b)} \quad \text{for} \quad \begin{array}{lll} T>0, & a=7.5 & b=237.3 \\ T<0, & a=9.5 & b=265.5 \end{array}$$

to calculate the Relative Humidity, RH, via

$$\%RH = e/e_s * 100\%$$

where e_s is the saturation vapor pressure calculated from the air temperature.

Table 9. Daily Average Weather and Acoustic Air Absorption Coefficients for Determining Typifying Weather for the McChord Sensitivity Study.

Date (Feb)	Average Temp °F	Average RH %	1kHz Abs. Coeff. dB/kft	Rank
11	35.7	82	1.4	10
12	35.4	85	1.39	8
13	35.6	85	1.39	9
14	30.7	65	2.01	15
15	33.0	83	1.48	14
18	49.7	86	1.34	2
19	47.7	81	1.31	1
20	43.6	73	1.37	5
21	42.0	72	1.4	11
22	44.2	70	1.39	7 <<
25	50.3	86	1.35	3
26	56.9	82	1.43	13
27	54.2	92	1.4	12
28	50.5	74	1.36	4
29	49.4	67	1.38	6

Effect of Aircraft/Operations Grouping

The AOP modeling practice of grouping aircraft operations by aircraft type and/or operation flown has a potential for inaccurately representing the noise produced by the actual operations. NOISECHECK procedures using the ^SEL analysis help to identify such problems, if comparisons of the individual operational noise levels are examined. Results drawn from the dominant noise producing operations are summarized in Table 10, as extracted from the model development results given in Appendix B.

Table 10. Comparative Effects of Aircraft/Operations Grouping on Measured ^SELs and Partial DNLs (DNL_i).

Operations	Profile Name	N_i #	SEL_i @ Site 1	SEL_i @ Site 9	Site 1 DNL_i Meas.	Site 1 DNL_i Pred.
On Departure Track:						
All F-15, F-106	7801	7.7	115	87*	74.5	67
F-106 takeoffs	2TNA	5.6	115	0	73	69
F-106 flybys	2FNA	.3	108	89	54	<
F-106 touch & gos	2GNA	.2	116	100	59	<
F-15 takeoffs	5TNA	.5	116	0	68	66.5
On Inner IFR Track:						
All F-15, F-106	7804	6.8	109		68	77.5
F-106 takeoffs	2TND	1.9	<		<	<
F-106 flybys	2FND	4.3	107		65	<
F-106 touch & gos	2GND	.6	109		61.5	68
On Outer VFR Track:						
All C-141	2702	17.9	108	93*	71	68
C-141 takeoffs	1TNB	1.5	104	0	57	59
C-141 flybys	1FNB	5.0	101	93	58.5	<
C-141 touch & gos	1GNB	11.4	109	93	70	66
Transient Departures:						
All C-135, others	T201	.4	119		66	61
C-135 takeoffs	6TNA	.27	121		66	54
DC8, E-3 takeoffs	9TNA	.13	106		<	<

NOTE: *= The SEL_is given for the original operations grouping at Site 9 were derived using similar results from later (MCS4) measured noise analyses. <= Small.

The noise produced over Site 1 by aircraft operations as originally grouped together is now evident. Comparison of the separately analyzed measured noise data in Table 10 reveals that grouping flybys, touch-and-gos, and takeoffs together is inappropriate. Flybys produce up to 8 dB lower ^SELs than those observed for takeoffs and touch-and-gos at Site 1. The C-135A northbound takeoffs produced an ^SEL 15 dB greater than the other aircraft (DC8, E-3) originally included in the same group.

Operations which produce very different multi-site noise patterns had also been grouped together. Northbound takeoffs were included in groups with touch-and-gos and flybys, even though they could not produce comparable noise at the distant sites, as shown in Table 10 by the Site 9 versus the Site 1 measured noise data. A sketch showing all the flight tracks used for the tabulated operations is given in Figure 6, and additional examples of the multi-site noise correlation problem will be discussed starting on page 39.

Variations in predicted partial DNLs help explain why the Site 1 DNL PoC decreased from .48 to .36 (Tables B-1C and B-2A) with the use of the more detailed operations model.

Note that the predicted dominant noise producing F-106 touch-and-gos flew only .6 operations per day compared to the original count of 6.8 operations per day for the entire group. Most of the operations included in that group (7804) were actually flybys. The new F-106 flyby operational profile modeled the aircraft at its cruise altitude over Site 1 (which proved to be wrong, see page 50), so the partial DNL contribution of this operation is small. The partial DNL predicted for the original group, 77.5 dB, was reduced to only 68 dB for the loudest remaining operation (2GND). The cumulative DNL predictions from the revised operational breakdown contributed strongly to a 4.5 dB decrease in the DNL_c, which was largely responsible for the decrease in the DNL PoC.

There also were reductions in the measured and predicted standard deviations resulting from the re-organization of aircraft operational groups. The estimated [sample] standard deviation of predicted DNL energy ($Sigma_c$) decreased by 77% due to the revised operational grouping used in the MCS2 AOP model. The measured [sample] standard deviation of SEL energy ($Sigma_s$) also decreased by 29% when re-analyzed with the revised operational grouping. These decreases in standard deviations reflect a smaller scatter in the measured noise per operation (group). The overall integrity of the AOP model was improved by the more detailed breakdown of operations, since it was based on a more realistic portrayal of the airbase noise environment. The fact that the DNL and SEL PoCs were reduced significantly merely reflects a more accurate appraisal of the consistency of the AOP model with the actual measured noise levels. The PoCs can now be expected to improve as each type of operation is examined more closely.

Implementation of Regrouped Aircraft Operations

The revised operational grouping discussed above resulted from a decision to model the C-135A and F-15 separately and the establishment of a fixed criteria to follow in grouping aircraft. The SEL predicted at a 1000 ft slant distance, produced by each aircraft using the NOISEFILE takeoff power and airspeed, was used as the metric for revising aircraft groups. Using this criteria, the new groupings reduced the scatter of individual SEL values from up to 15 dB to about 4 dB. All of the dominant noise producing aircraft were given separate operational profiles within the MCS2 model for their operations on each flight track. The minor noise contributing operations were grouped as shown in Table 4. If an operational profile for a minor noise contributing operation (i>18) by a transient aircraft was needed in the AOP model, a suitable default operational profile was selected from the BASEOPS library of default profiles. This was the case for the new transient group "8".

MULTI-SITE NOISE ANALYSIS REQUIREMENTS

One of the principal features of the McChord AFB database was that it was an ambitious effort at a basewide noise survey. The logged operations data and measured noise were collected over a nine month long period to measure changes in the long-term noise exposure and compare the findings with predicted levels generated using NOISEMAP. Noise data were collected at multiple sites in hopes of shredding out useful information regarding many aspects of noise propagation and analysis.

Four noise measurement sites were active during the three weeks of 11-29 Feb 1980 currently under study. These sites give considerable information on aircraft noise exposure immediately after takeoff (Site 1), on straight-in approaches and Instrument Flight Rules (IFR) touch-and-gos (flight track 34B, Site 9), and on Visual Flight Rules (VFR) flight patterns (flight tracks 34C and D, Sites 7 and 8). A plot of the measurement sites and relevant flight tracks is given in Figure 6. Many of the measured noise events were recorded nearly concurrently at Sites 7 and 8, and sequentially at sites under approach or flyby patterns. Therefore a single database was compiled in which correlations of measured noise events could be examined. The correlation of noise data received from all four measurement sites to the operations log established part of the structure for the MCSS database file. The database analysis methods are discussed in Appendix A, and the database structure and its contents are documented in Appendix D.

Temporal Collation of Measured Noise Event Data to Operational Records

The McChord measured noise data was originally recorded on printed paper tapes. The measured noise events' data were entered into the computer by hand so that they correlated with their respective operational data. Using an optical character reader was impractical since the data would still need to be re-formatted and collated to the operations log. Currently, there is no existing computerized procedure or algorithm for performing this function, and it was not reasonable to develop one for the purposes of this study.

It was decided to use ENABLE's database DISPLAY mode to display selected fields of twenty records simultaneously, and edit the appropriate site's data fields for the records displayed. This mode was used since it provided all the operational information from the relevant time frame, which then allowed for the correlation of a given measured event to its appropriate logged operation.

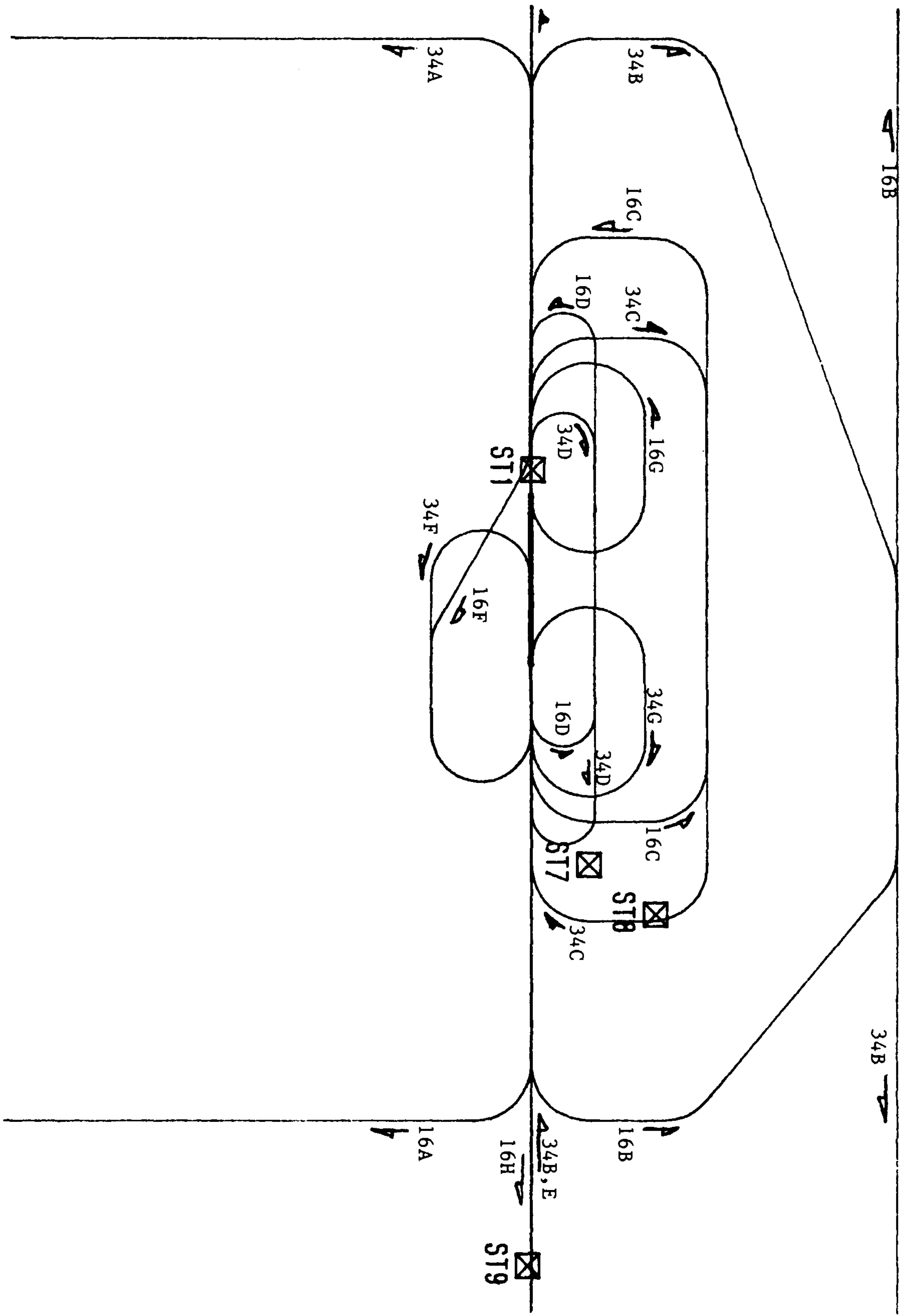


Figure 6. Map of McChord AFB Noise Measurement Sites and Basic Operational Flight Tracks

Guidelines were established so that a systematically accurate analysis of the database file was accomplished. The operations log (Appendix D, pg D-11) has many occurrences of aircraft (usually the F-106) operating in pairs. Since these usually result in only one measured noise event, the data from that event was entered in both records, and the word "PAIR" entered in a field defined to record such comments (COMMENT#). This comment was recognized by another field defined to derive the appropriate correction (S#SELC). A -3 dB correction was applied to the measured SEL for "PAIR" events. In the case of triplets or quadruplets of aircraft, the appropriate comments were "PAIR+1" and "PAIR+2", with corrections of -4.8 and -6 dB, respectively. This method provided an accurate count of operations and the calculation of ^SEL.

For the vast majority of measured noise events, it was relatively straightforward to determine which operations log entry contained the aircraft movement which created the noise. At Site 1, aircraft takeoffs (TO or T), touch-and-gos (TG or G), and flybys (FB or F) to the north created a noise event which occurred about 1 minute or less after the logged operation time (the time at which the aircraft passed the airbase control tower observer). Conversely, noise events corresponding to landings (L), TGs or FBs to (and some takeoffs from) the southbound runway occurred about 1 minute before the logged operation time. These observations oversimplify the situation, since during peak operating periods, aircraft were sometimes passing by Site 1 at a rate of around 1 per minute.

A few inherent difficulties were unavoidable. An aircraft operation may create two noise events if the measured noise level dropped below the 65 dB threshold of the noise monitor. If two dissimilar aircraft flew in the vicinity of the monitor simultaneously, one may create noise which masks the noise of the other. It was evident that the site clock and tower clock were not synchronized, and even shifted with respect to one another occasionally. There were also a number of examples of the original tower log records having typographical errors of various types. Every effort to accommodate or correct for these inherent problems was made in the course of collating Site 1 data, during the initial screening phase.

All things considered, it was almost impossible to generate a fully correct, collated database which included all measured noise data associated with an appropriate operational logged event. Given the minimal amount of aircraft tracking information available, some judgement was required for certain circumstances. If the database collation becomes suspect during the model development process, it may easily be altered to reflect new flight tracks or re-collated if errors are uncovered. The

automated ^SEL analysis allows such changes to be accounted for easily. Lapses in noise measurements and measured noise events which cannot be correlated to an aircraft operation are corrected starting on page 69.

Rationale for Altering Logged Operational Records

The Airbase Operational Profiles Model must be constructed to closely represent the actual operations occurring at the airbase. It is thus important to be aware of how the logged operations are modelled during the process of collating the site-specific measured noise data. A few systematic errors became evident while collating Sites 7, 8 and 9 measured noise data. They stem from the fact that the tower log of aircraft operations originally recorded where the aircraft flies to, but did not indicate where the aircraft came from. The collating process retained the temporal sequence of events, such that a measured noise at Site 7 or 8 was associated with a landing, touch-and-go or flyby recorded 1 to 3 minutes later in the operational log.

The logged track for landing operations originally always indicated a straight-in (unknown) approach, passing 3500 feet west of Site 7. Sites 7 and 8 measured noise levels for aircraft landing from closed pattern flight tracks were always considerably louder than those from straight-in approaches. In such cases the correlation of closed pattern landing noises to straight-in approach operational records resulted in a significant difference between predicted and measured noise data. The log was therefore changed to indicate landing operations from closed patterns by examining the sequence of a particular aircraft's operations in the operational log. Every landing's operational record was examined to determine the associated aircraft call sign. If the same aircraft was documented in the tower log as having been on a closed pattern flight track prior to landing, the operational record of the landing was altered to reflect that fact. This approach would have been impossible if the McChord measurement study's log had not documented the aircraft's call sign and records of all flyby and touch-and-go operations, which are normally not recorded in routine tower logs.

Similarly, it was common for the C-141 or F-106 to make "mirror landings" or a missed approach prior to landing. The aircraft would fly straight in over Site 9 and conduct either a touch-and-go or a flyby, completing at least one circuit on an inner closed pattern before landing. The first operation in the sequence was logged as a flyby or a touch-and-go (FB or TG), and likewise for each pass prior to the actual landing. This type of operation resulted in a measured noise event occurring at Site 9 which correlated with an inner closed pattern flyby or touch-and-go in the log. However, operations modeled on the inner closed

pattern tracks could not generate noise at Site 9, some 22000 feet away. The operations log was again modified to record a missed approach (MA) as the operation for the appropriate (initial) record. New flight tracks were eventually added to account for changes in the operational log in the MCS4 AOP Model, as detailed on page 66. Since such new flight tracks were used in the AOP model to distinguish operations with particular multi-site noise correlation patterns, they will be discussed in the following section.

Effects of Distinguishing Logged Operations with Particular Multi-Site Noise Correlations

The second developmental AOP model (MCS2) was derived based on the requirement to distinguish many different operations which had originally been grouped together. It included several other modifications to improve the overall integrity of the airbase operations model. It was initially compared to the Site 1 measured noise data which had been analyzed without the benefit of having identified the missed approach (MA) operations. When the additional site measured noise data were added to the MCSS operational and measured noise database, the missed approach operation type was distinguished by altering the appropriate records as discussed above. This change was vital to accomplishing a reasonable overall ^SEL analysis and evaluation of the measured noise data at all sites. It did not, however, have a strong impact on the SEL comparison to Site 1 noise measurements. The Site 1 SEL PoC increased from only .053 to .09, as noted in Table 11 (see Tables B-2A and B-3A also). It was evident then that the modeling of aircraft power/altitude management needed to be examined near Site 1 since the location of flight tracks cannot be adjusted in that area of the airbase. The AOP model was developed further to account for such complicating factors in the next chapter (pg 46).

The initial ^SEL analysis of Site 7, 8 and 9 measured noise data included the missed approach operation type. The results of this analysis were compared to the MCS2 AOP model to give a baseline assessment of the types of operational modeling problems which must be solved. Three operation types were then distinguished in the ^SEL analysis which were not included in the MCS2 AOP model. These were: (1) landing operations from closed pattern flight tracks (1LNC and 2LND for example); (2) missed approaches (such as 1MNC, which encodes an MA operation as discussed above) and (3) straight-through flybys and touch-and-gos (1GNA in particular). To quantify the effects of including these operation types on SEL and DNL PoCs it was necessary to extract the properly modeled profile predictions from the final AOP model (MCS4).

The baseline assessment of the MCS2 AOP model indicated several problems which had to be resolved so that they would not mask the effects of adding the three new operation types. The MCS2 model's prediction of the SEL at Site 9 for the C-141 touch-and-go operations on the outermost (Instrument Flight Rules, IFR) closed pattern (1GNB) is 4 dB too high (see Table B-3H). Because it was the dominant noise producing operation at Site 9, this overprediction caused the DNL_c to be artificially high. The comparison summarized in Table 11 below adjusted the predicted SEL to agree with the measured level, without actually changing the AOP model. This is an example of an aircraft power management problem, a factor in the operations model which will be discussed in the following chapter.

A similar problem occurred at Site 8, with its dominant contributing operation, the C-141 touch-and-gos on the outer Visual Flight Rules (VFR) closed pattern (1GNC), being 8 dB overpredicted (see Table B-3F). This operation is an example of a flight track location problem, see page 61. The DNL_s data for Site 8 (Table 11) included a minor correction to eliminate measured noise data from uncorrelated night operations which had erroneously been included in the MCS2 ^SEL analysis.

The MCS4 AOP model predictions for specific operations (as listed in Tables B-5B, D, F and H) were added to the MCS2 Probability of Consistency summary spreadsheets and included in the SEL PoC computation. An estimate of the impact on the total DNL_c was made based on the level difference between the cumulative DNL_{ct} with and without the added SEL predictions. The results of the PoC computations were then summarized for comparison to the MCS2 model results in Table 11.

Table 11. Comparative Effects of Including Operations with Particular Multi-Site Noise Correlation Patterns in the Airbase Operational Profiles Model

	DNL_c	DNL PoC	DNL_s	DNL_{ct}	SEL PoC
Site 1- MCS2 AOP :					
vs ˆSEL without MAs	75.8	.356	78.3	75.4	.053
Std Analysis (w/MAs)	75.8	.356	78.1	75.6	.090
+1 MA (i=11)	˜76.0	.379	78.1	75.8	.110
Site 7- MCS2 AOP :					
Std analysis	54.9	.475	55.7	54.0	.619
+ pattern landings (i=5,11,12,19)	˜56.1	.646	55.7	55.1	.851
Site 8- MCS2 AOP :					
Std analysis	55.6	.742	52.7	55.2	.632
with Corrections	˜50.9	.308	51.8	50.5	.835
+ 2 MAs + 3 VFR Ls (i=7,9,10,16,29)	˜51.8	.393	51.8	51.4	.946
Site 9- MCS2 AOP :					
Std analysis	60.6	.934	59.3	60.5	.459
Adj prediction (i=1)	˜58.1	.406	59.3	58.0	.502
+ 3 MAs + 1GNA (i=5,7,8,13)	˜58.8	.527	59.3	58.7	.730

NOTE: It is now quantifiably evident, from the results documented above, that including these particular types of aircraft operations improves the overall validity, and PoC, of the Airbase Operational Profiles model in question.

AIRCRAFT PERFORMANCE ADJUSTMENTS

The performance of an aircraft during actual airbase operations of a given type may be very difficult to document adequately for the purposes of environmental noise prediction. The variability of individual performance parameters (power setting, altitude and airspeed) may be minimal for some aircraft operations, or very high for others. Cargo aircraft with a known load weight perform in a very predictable and repeatable fashion. High performance fighter jets, on the other hand, are subject to a number of factors which influence performance, particularly including drag effects from external fuel tanks or weapons. They also may or may not use afterburner during takeoffs depending on the mission plan, local weather, or local airbase operational restrictions.

In a situation where a statistically meaningful number of operations have documented performance parameters, it is possible to analytically arrive at a single performance profile which typifies the aircraft's operation by the methods discussed on page 4. This approach was not entirely possible during this study and may also be difficult in general due to a lack of accurate power management records.

The approach in this study was to first proceed by adjusting the power setting and altitudes for aircraft operations whose flight tracks are known and nearly fixed and examine more complex adjustments such as flight track mapping later. The aircraft's airspeed was treated as a dependant variable determined by power setting and altitude. By examining the more tractable (altitude) and sensitive (power setting, see Ref. 11) operational parameters first, the value of accurate flight track mapping was evident. Examples of improvements in several aircraft operational profiles SEL predictions will serve to quantify the results.

Adjustment Methodology Used in this Study

All individual aircraft operational profiles used to model airbase operations must reflect the actual performance capability of the aircraft. In most cases it was possible to acquire such information through consultation with local pilots. Due to the passage of time and changes in assigned aircraft, reliable profile information was essentially impossible to obtain in this manner for all aircraft in the McChord study except the C-141. It was decided to make adjustments based on experienced judgement of the operational characteristics of each aircraft as documented in their respective Technical Orders. An example of the minimal performance specifications which must be met by an F-106 on takeoff is given in Figure 7.

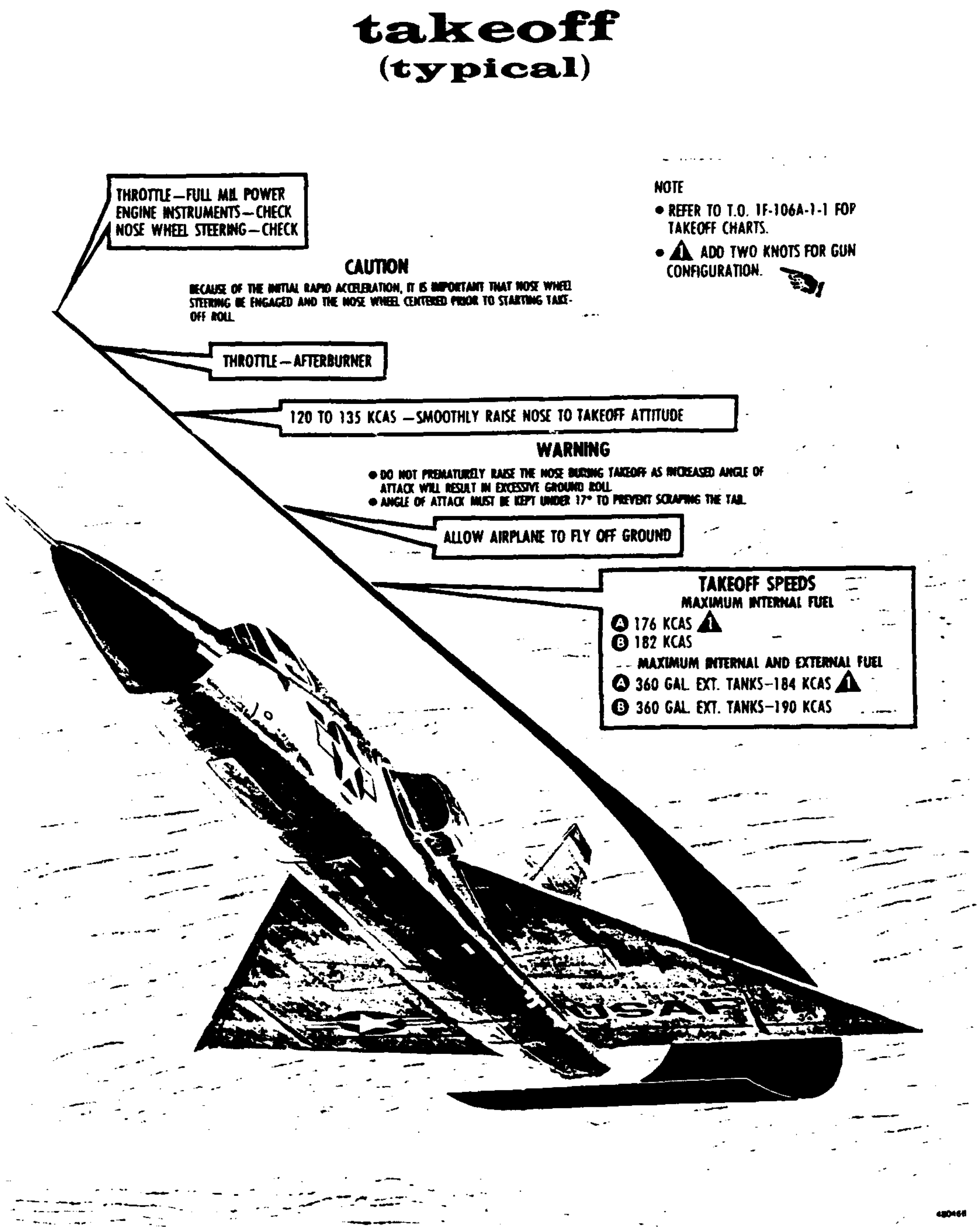


Figure 7. F-106 Typical Takeoff Procedure

Illustrates the minimum operational requirements for an F-106 aircraft takeoff, and thus the extent to which pilot technique influences the departure profile.

The F-106 Technical Orders give much more detailed performance data than that indicated in Figure 7. A preliminary study of takeoff profiles derived from such Technical Order performance data and the typifying weather conditions was conducted during Phase I. The SEL comparative analysis of Site 1 measured noise data clearly showed that the dominant noise producing aircraft at McChord AFB never were flown in accordance with the Technical Order performance data. The SEL differences from such comparisons often exceeded 6 dB. The F-106 measured noise level was lower, indicating that the actual F-106 power management and altitude profile flown was a noise abatement profile which can only be approximated here.

For an aircraft in steady-state operation, it is possible to determine the exact power setting which would be required to produce a given SEL. Given the aircraft's slant distance and airspeed, only a simple interpolation between NOISEFILE power settings is required. This approach essentially reverses the algebraic methodology used by the Omega 10 program (Ref. 12) to predict SEL vs distance functions for non-standard power settings and airspeeds. There are a few assumptions implicit in this method which reduce the accuracy of its results in actual practice. The Omega 10 program also calculates the atmospheric absorption due to the typifying weather, which is prohibitively complex to include when estimating a power setting. NOISEMAP computes the total acoustic energy generated by all flight profile segments and not just for the segment at the closest point of approach to the ground location of interest. For an aircraft not in steady-state flight it would be quite difficult to consider all profile segments when estimating engine power settings corresponding to a given measured SEL.

Therefore, an iterative process was used to determine appropriate power setting adjustments to the original power management profiles. The aircraft's performance during takeoff (as documented in the Technical Orders) was considered. The climbout rate and airspeeds were therefore dependant on the takeoff power setting used. The airspeed in level flight is dependant on altitude and power setting. It is also important that the profile be extrapolated to regions beyond the measurement sites in a physically realistic fashion. The various estimated adjustments used were based on discussions with knowledgeable pilots. In situations where this was very difficult or impossible, only small adjustments were made to existing profiles. NOISEMAP's default profiles for transient military aircraft (Ref. 18) were sometimes used as a baseline source of typical aircraft performance information.

Given the circumstances and approach described above, all aircraft performance profiles represent a model of an

acoustic statistical simulated average of real flight characteristics. The process of optimizing the profiles by comparison to measured ^SELs assures that they include the effects of energy averaging of measured noise levels and compensate for acoustic propagation effects. Such profiles will not necessarily be identical to the operational profile which a pilot perceives as typical of a particular operation.

Several steps were taken to reduce the time spent in the process of adjusting the profiles. BASEOPS provides, in it's Subset Edit Menu, an option to scale the number of Flyby or Ground Runup operations. For the microphone locations in the McChord study, noise from ground runup operations were insignificant contributors to the total noise at the sites and were ignored using the BASEOPS scaling option. [It is also possible to examine more minor noise contributing operations by simply scaling to 0 all of the top 18 predicted profiles. This option normally has little value and was not used in this study.] The NOISEMAP 6.0 Master Control Module also provides, in its Run Options Menu, an option to calculate only the Specific Point Output predictions. Selecting these options reduced NOISEMAP runtime by over 90% and was used extensively in this study.

The overall approach to adjusting individual aircraft operational profiles was applied near Site 1 first. The optimized profiles were also used for similar southbound takeoffs. The aircraft operational profiles near Sites 7 and 8 required some changes in the location of several flight tracks and aircraft performance to be consistent with the measured noise data. The Site 9 noise was dominated almost exclusively by several similar types of C-141 operations. New flight tracks and performance adjustments were necessary near this site. The flight track mapping problem was approached at the same time that performance modifications were made influencing these sites.

Altitude Adjustments

The aircraft's altitude, which determines the noise propagation distance to a given point on the ground, has a major effect on the SEL produced. This effect is due to the spherical spreading of acoustic energy from a point source and absorption by the atmosphere. The Site 1 noise measurements clearly showed this effect of altitude on noise level. Only at Sites 1 and 9 was it reasonable to assume that the aircraft passed nearly overhead for all major noise contributing flights. This was true with the minor exception of flight track dispersion, which was considered negligible near Site 1. At Site 9, the dominant noise contributing operations had an altitude which was determined

by the three degree approach glide slope. However, McChord tower log records provided valuable documentation of the variability in altitude for flyby operations over Site 1.

A particularly good example of the need to consider the variable altitude data is had by examining the model of the F-106 flybys on the inner VFR closed pattern (2FND). The MCS2 profile called for the aircraft overflying the runway at 2000 feet, the same altitude used for the downwind leg of the loop. Although most such flybys were conducted at this altitude, the tower log revealed that the aircraft sometimes overflew the runway at or below 50 feet! An analytic method (Perceived Mean Altitude, PMA) was devised to derive an appropriate noise related flyover altitude from multiple altitude data records.

Determining the Perceived Mean Altitude

The acoustic energy ($E=10^{SEL/10}$) propagated to the ground from an aircraft flyover operation is proportional to the inverse square of the minimum slant distance to the aircraft. The atmospheric absorption effects on sound propagation, (see pg 33), are relatively minor for noise events at Site 1 (slant distance less than 1000 ft). The aircraft was assumed to maintain level flight until passing directly over Site 1 (i.e., no climbout effects are involved), so the minimum slant distance was equal to the altitude of the aircraft. The Perceived Mean Altitude (PMA) is defined as the inverse root mean of the inverse squares of all altitudes recorded for the aircraft operation in question:

$$PMA_i = \sqrt{\frac{1}{n_i} \cdot \sum_{k=1}^{n_i} \left(\frac{1}{ALT_{k,i}} \right)^2}$$

Thus the average acoustic energy measured at a site will be produced by an aircraft operating at approximately the PMA. A procedure for extracting the necessary information from the MCSS database and implementing the Perceived Mean Altitude calculation is discussed in Appendix A (pg A-6). Table 12 summarizes the calculation of PMAs for operations which had a measurable effect on the DNL at Site 1.

Table 12. Calculation of Perceived Mean Altitude for Four Flyby Operations Influencing Site 1 Predicted SELs

AORT	Operation
1FNB	= C-141 flyby north on the outermost IFR pattern
2FND	= F-106 flyby north on the innermost VFR pattern
5FSD	= F-15 flyby south on the innermost VFR pattern
1FSB	= C-141 flyby south on the outermost IFR pattern

PMA =		425		77		213		172
Use -> for		400		80		200		200
AORT =	1FNB		2FND		5FSD		1FSB	
	#ops	@ Alt.	#ops	@ Alt.	#ops	@ Alt.	#ops	@ Alt.
	25	3000	23	2000	1	3000	1	1500
	2	2000	1	1500	2	2000	2	1000
	3	1500	2	1000	1	600	1	880
	25	1000	2	400	2	200	2	100
	1	900	9	200	1	100		
	2	700	13	100				
	6	500	9	50				
	4	400	2	20				
	1	300						
	3	200						
	1	150						
	2	100						

Altitude recorded in feet

NOTE: The altitudes shown here do not appear in the MCSS database summary given in Appendix D. The altitudes used apply only over the runway, since the aircraft is still assumed to return to its cruise altitude for the downwind leg of the pattern, see Appendix C.

It is apparent that even relatively few low-altitude flights can significantly alter the PMA for a given type of operation. For instance, for the F-106 northbound flybys on the innermost closed pattern (2FND), only 11 out of 61 flights had an altitude below the associated PMA.

Effects of Altitude Adjustments

The PMA analysis indicated quantitatively the change in modeled aircraft flyover altitude which was required. The various flight profile models were altered and the consequent effect on predicted Site 1 SELs summarized in Table 13A. The four flyby operations included in the summary had a measurable effect on the Probability of Consistency at Site 1. Three minor noise contributing flyby operations were also revised with no measurable effect.

Table 13A. Summary of the Effects of Adjustments to the Modeled Altitude on the Predicted Site 1 SELs and partial DNLs.

AORT	Measured #/day	Measured ^SEL	MCS2 Est SEL	MCS3 (incl. PMA adj.) Pred SEL_j	MCS3 (incl. PMA adj.) $DNL_{c,j}$
2FND	4.0	107.8	80	107.7	64.3
1FSB	0.4	112.1	90	*113.3	59.8
1FNB	5.1	100.9	84	**100.9	58.5
5FSD	0.5	111.0	95	***119.3	66.6

*= includes power setting roundoff
**= includes power setting adjustment
***= no power setting adjustment

NOTE: The MCS2 SEL had to be estimated since the actual predicted SELs were too low to appear in the noise contributor's summary. The estimate was based on the formula:

Est SEL = Pred SEL - 20*Log(MCS2 Alt/PMA Alt)

The predicted partial DNLs ($DNL_{c,j}$) were used to adjust the DNL_{ct} and therefore DNL_c from Table 11 as summarized in Table 13B. The significant improvement in both PoCs is evident, particularly considering that the flyby operational noise was overwhelmed by departure noise at this Site.

Table 13B. Effect of Adjustments to Flyby Altitudes Applied after the Cumulative Adjustments of Table 11.

	DNL_c	DNL PoC	DNL_{ct}	SEL PoC
MCS2 incl. 1 MA (i=11)	~76.0	.379	75.8	.110
+ 4 FB adj. +(i=6,13,14,18) -(i=5,35)	~76.9	.510	76.6	.276

The results summarized in Table 13A indicate a substantial improvement in the comparison of measured to predicted SELs when the 'most frequent' altitude was replaced by the PMA altitude in the AOP model used. The improvement in the PoCs, Table 13B (barring the effects of other complicating factors), demonstrates the value of this adjustment for use in profile modeling. The PMA methodology is validated by these results, since it provides a good approximation of a typical aircraft flyover altitude. The success of this analysis justifies the approach used in "Deriving a Nominal Flight Profile from Aircraft Performance Records", page 4.

Effects of Power Management Adjustments

The power management of aircraft is perhaps the most difficult aspect to quantify accurately for the purposes of aircraft operations modeling. This is partly because the noise produced by an aircraft is very sensitive to power setting variations (Ref. 11). The aircraft operations modeling implemented by BASEOPS uses a step-like function to describe power setting changes. The aircraft performance profile is described by the distance travelled and altitudes at which these power setting changes are made. A pilot typically will accelerate using a prescribed power setting during takeoff roll, shut off afterburners if they are used, and after some specified altitude and airspeed is attained, continue to climbout using a different power setting and climb rate. Cargo aircraft will usually level off at an assigned altitude to gain more airspeed and later resume climbout.

Determining the distance traveled and altitude at each point that the power setting is changed is a fairly complex task using information received from pilots or technical performance data. Considering that an aircraft performance profile is needed which typifies numerous different actual flights generating a long-term average noise level contour makes the problem almost intractable from an analytic standpoint. An approximation method for estimating an appropriate power setting model is discussed on page 4, for a hypothetical case.

The McChord AFB measurement study provided no documentable sources of information regarding the actual power management of individual aircraft operations. Consequently, it was only possible to describe the power management changes required to optimize the dominant noise contributing operations and estimate their cumulative effects at the relevant measurement sites.

Site 1 -

The noise levels produced at this site were strongly dominated by the power management aspect of aircraft performance. The top five noise producing aircraft operations were either takeoffs or touch-and-gos, which use similar performance data near the site location (1000 ft beyond the end of the runway). The point that the aircraft initiated a steep climb after takeoff occurred near the site and had a strong effect on predicted noise levels. A decrease in modeled altitude over the site was often required, which produced up to 3 dB increases in predicted SEL for some operations. Power setting changes were nominal for most operations, producing less than 2 dB effects on

predicted SEL. It was necessary to change the power management of the C-135A to reflect the normal use of takeoff power with water injection.

Power setting differences in more minor noise contributing operations caused up to 8 dB changes in their individual predicted SEL ($SEL_{c,j}$). The cumulative impact of these changes increased the DNL_c by 1.5 dB over the DNL_c cited in Table 13B. This included six $SEL_{c,j}$s which significantly increased and six which decreased. The Probabilities of Consistency were strongly affected by the power management changes. The SEL PoC increased from .276 to .865 and the DNL PoC increased from .510 to .914. No further improvements in the PoCs were caused by additional adjustments discussed later in this study.

Site 7 -

The cumulative DNL at this site was largely affected by flight track location problems. Some power management changes were made along with changes in the flight track patterns, mostly to accommodate altered approach operations. The impact of the power setting changes could not be discerned from the impact of the changed flight track location. The operational profile changes which included only power management adjustments increased both DNL_cs by about .4 dB over previous model versions. This effect included increases to three operational SEL predictions and decreases to three others. It is misleading to estimate the impact the DNL increase had on either PoC since the C-141 touch-and-go operations on the outermost IFR flight pattern (1GNB) were overpredicted even in the final AOP model. The reason that this discrepancy was not eliminated will be discussed starting on page 57.

Site 8 -

The Site 8 measured noise levels were almost totally controlled by aircraft operations on VFR closed patterns which had turns located near the site. A negligible change in predicted DNL resulted from simple power setting changes on noise contributing operations near the site. Two such operational changes which resulted in increased SELs were offset by the decreased SEL prediction due to changes in the F-106 southbound takeoffs to the outermost IFR pattern (2FSB). The Site 8 PoCs were both exaggerated in the MCS3 AOP model simply due to an SEL overprediction for C-141 operations conducted directly over the site, on the outer VFR pattern (the 1GNC and 1FNC profiles).

Site 9 -

Aircraft on approach to runway 34 (including similar flyby and touch-and-go operations) totally dominated the noise

levels measured at this site. Approaches were assumed to be on a 3 degree glide slope and thus only subject to power setting changes. Flyby and touch-and-go operations of similar aircraft usually produced very similar noise levels, indicating that they were operating in a similar engine power setting and drag configuration near this site. Both DNL_cs were increased by about 1.9 dB due to power management changes in several operations. This affected the SEL PoC by increasing it from .730 to .802. The DNL PoC was similarly increased from .527 to .807. The DNL PoC was later improved by adjustments made based on measured hourly noise level corrections (pg 70).

Further Adjustments Required for Accuracy

There were two types of aircraft operations which required adjustments to their profile models which did not fall into the categories of operational adjustments previously described. These are: (1) disabling the takeoff roll algorithm and (2) separation of closed pattern operations. The modeling of F-106 and F-15 northbound departures and all takeoffs to the VFR closed patterns originally gave SEL predictions for Sites 7 and 8 which were between 2 and 9 dB higher than their respective measured ^SELs. Profiles of takeoff (and landing) operations to the outer VFR pattern (1TNC and 4TNC in particular) also required substantial revision near Sites 7 and 8. This was necessary so that the assumptions made in generating the AOP model are consistent with the TEMPORALLY correlated measured noises recorded for such operations in the operational and measured noise database. The integrity of the AOP model was improved by significant corrections of the correlation between the predicted noise contributor ranking and the measured noise contributor ranking.

Disabling the Start of Takeoff Roll Model

Sites 7 and 8 were located to the rear of departing aircraft and recorded noise measurements which were influenced by the start of takeoff roll. Several northbound departure noise predictions originally ranked in the top 18 noise contributors list, although the same operations ranked lower (i>17, often i>36) in the measured noise contributors list. This situation was largely resolved by changes in noise predictions and ranking, as discussed in previous sections of this report. Two fighter jet takeoff operational models needed further alterations to reduce ~9 dB overpredictions.

The F-106 and F-15 northbound departure models (2TNA, 5TNA) were altered to disable the Take-Off Roll noise subroutine. This was accomplished by using a "rolling start" in the takeoff profiles, since a zero airspeed value for the first segment of a profile is required to initiate the Take-Off Roll noise subroutine in NOISEMAP (Ref. 13). The resulting

takeoff roll noise level prediction of the F-106 was thus reduced by 6 dB. The adjusted prediction was still 3 dB higher than that measured at Site 8 (Table B-5F, i=19). This may be due to a number of factors involved in the noise prediction modeling of takeoff roll, such as the assumption of a 4 knot downwind noise propagation condition. A more detailed discussion of the Take-Off Roll algorithm and the possible causes of this discrepancy are discussed as an "Assessment of Noise Prediction Models", (pg 57).

Separating Closed Pattern Operations

Normally, a BASEOPS AOP model would include a takeoff AND landing together as a single closed pattern operation, and the profile would be counted as such. Under this proviso, the modeled closed pattern operation includes a takeoff followed immediately by a landing of the aircraft conducting such operations. In practice, however, aircraft never (except in an emergency) actually land immediately after takeoff. [The original McChord AOP model did not include such closed pattern takeoff/landing operational profiles, as that capability did not exist in NOISEMAP in 1980. All such landing operational profiles were added during this study separately, when it became evident that they were not modeled correctly in the original AOP model (see pg 13).] The next actual operation, in the time sequence of a particular aircraft's operations, is usually a flyby or a touch-and-go. Establishing a correct (temporal) correlation of noise events from each successive operation is important in performing the NOISECHECK procedural ^SEL analysis.

The method used to establish an accurate time correlation of measured noise events to the logged operational records is discussed starting on page 39. This method does not allow noise produced during the latter half of any northbound closed pattern operation (over Sites 7 and 8) to be correlated with the associated aircraft's takeoff profile. All northbound aircraft flyover noises recorded at Sites 7 and 8 were correlated with flyby, touch-and-go, or (separate) landing operations which were logged as having occurred one or two minutes after the time the noise was measured. Thus the temporal sequence of measured noise events was preserved within the MCSS database. The Site 7 and 8 measured noises were then properly correlated based on the recorded times of all logged operations. This allowed the correct calculation of measured average takeoff roll noise levels and their separate comparison to operational model predictions.

Therefore, it was (and is) necessary to model closed-pattern takeoff and landing operations separately, for NOISECHECK purposes, using profiles which predict noise levels over each half of the closed pattern. The existing operational profiles were adjusted by using a very low power setting and

forcing the modeled aircraft to high altitudes during the appropriate portion of the profiles in question, causing the predicted SEL to be reduced to a negligible level. The high altitude was necessary because there are extrapolation limits imposed on allowable adjustments to power setting, but not altitude, within NOISEMAP.

The use of separate profiles to model the takeoff and landing portions of each aircraft's closed pattern operations has several direct consequences. Since their respective noise predictions will not overlap on the ground, the overall noise level contour is not affected. The use of such profiles will produce an AOP model which can properly distinguish each aircraft operation for comparison of their measured and predicted noise levels. The BASEOPS count of closed pattern operations will be revised accordingly. The applicable counting rules should be considered whenever operational counts are considered. Comparison of modeled operational counts was not conducted in this study simply because the limited 12-hour time frame examined had a normal imbalance in takeoff versus landing operations.

Assessment of Noise Prediction Models

The detailed analysis of measured ^SEL allowed noise events to be evaluated which would otherwise have been lost in the background of dominant noise contributing operations. The relatively minor noise contributing operations were not of great significance in the NOISECHECK analyses at the specific ground locations in this study. However, the comparisons of such individual operational noise predictions to field measured noise data were useful for evaluating various algorithms used within NOISEMAP.

Site measurements which included contributions from takeoff roll noise provide a prime example of the derivation of a meaningful conclusion regarding predictive noise modeling. The thorough interpretation and examination of measured noise events made this possible. It was explained on page 55 that the Take-Off Roll noise subroutine was disabled to prevent it from generating large overpredictions at Sites 7 and 8 for the noise levels generated by F-106 and F-15 takeoff operations. There are two factors which influence the takeoff roll noise at these sites.

First, any aircraft conducting a stationary engine runup generates noise which has a unique characteristic directivity pattern. All such engine runup noise level directivity patterns exhibit a "cone of silence" in the rear of the aircraft, roughly bounded by a radial line drawn at about 160° from the nose of the aircraft. Sites 7 and 8 were situated near this angular boundary roughly 13000 and 17000 feet away, respectively. Second, the Take-Off Roll algorithm is formulated to use the engine runup noise levels

to generate predicted noise levels to the rear of the aircraft at the start of takeoff roll and during its acceleration away from the brake release point. This is accomplished by applying a noise level correction array to the engine runup noise level contour (Ref. 13). This correction array was developed from an analysis of measured noise data collected during cargo type aircraft takeoffs.

There may be substantial differences between the takeoff noise level correction array needed to adequately model high performance jets versus the existing correction array derived from cargo aircraft. In addition, the existing correction array may tend to underestimate the influence of the "cone of silence" in computing the contribution for start of takeoff roll noise. It is certain that this McChord operational noise database does not provide sufficient data to analytically support a revision of the Take-Off Roll algorithm currently used in NOISEMAP.

A problem was also experienced when modeling the C-141 approach operations. The average noise levels measured at Sites 7 and 8 could not both be accommodated by any known type of adjustment to the operational profile. A comparison of measured and predicted noise levels at the sites was necessary to evaluate the possible source of this discrepancy. Of all the operations which fly along the runway centerline, only two provided enough measured and predicted noise level data.

The C-141 touch-and-go operations northbound on the outermost IFR pattern (1GNB) produced significant noise levels for comparison, although similar landing and flyby operations did not. The F-106 southbound takeoffs were conducted either straight out (2TSH) or with a 90 degree right hand turn (2TSA). These produced similar noise levels at the two sites, and due to the low number of operations of this type, were combined (2TS_) in Table 14. The noise level data summarized below were derived from Tables B-5D and F.

Table 14. Lateral Attenuation of Two Aircraft Operations Measured at Sites 7 & 8

	Site 7 SELs				Site 8 SELs			
	pred	meas	+ 95%ci	-	pred	meas	+ 95%ci	-
1GNB	87.1	87.1	1.4	-2.0	76.6	71.5	1.8	-3.0
2TS_	98.	98.1	1.0	-1.5	91.1	93.1	1.3	-1.8

	Site 7		Site 8	
	Elev. Ang.	Slt. Dist.	Elev. Ang.	Slt. Dist.
1GNB	7.29°	3437 ft.	4.12°	7412 ft.
2TS_	44.12°	4755 ft.	25.20°	8173 ft.

The noise prediction model algorithm influencing these calculated SELs is the Lateral Attenuation subroutine. Lateral attenuation produces a functional interpolation between pure ground-to-ground noise propagation and pure air-to-ground noise propagation. The proportion of these two types of propagation is determined by the elevation angle to the aircraft. Air-to-ground propagation effects include spherical spreading and air absorption as discussed (see pg 33). Ground-to-ground propagation also includes effects due to ground impedance and atmospheric refraction. Unless these aircraft consistently fly on tracks that are offset from the defined straight-in flight track (which is very unlikely), some acoustic propagation mechanism must be responsible for the 2-5 dB discrepancies between predicted and measured noise level differences seen here.

The tight distribution of measured noise levels indicates that the aircraft's operation was very consistent relative to the other operations near these sites. This further indicates that the level difference discrepancies are not entirely due to the effects of flight track dispersion. The measurement of an aircraft operation's lateral attenuation (reflected in the level difference here) is known to be aircraft type dependent, whereas the Lateral Attenuation model is an ensemble average for all Air Force aircraft. [A very appropriate approach to a model for such broad application.] Although no measurements of the F-106 aircraft's lateral attenuation were made during the development of the algorithm, the measurements of other fighter aircraft (Ref. 14, pg 19) indicate that this factor could easily explain the -2 dB level difference discrepancy measured here. The lateral attenuation measurements (Ref. 14, pg 15) for the C-141 aircraft are <1 dB (best fit) less than the model predictions, for 4-7 degree elevation angles. This figure would account for part of the +5 dB discrepancy between modeled and measured level differences.

There is the further possibility that the noise propagation conditions were not entirely consistent with the assumptions used to predict ground-to-ground propagation. The C-141 noise measurements are definitely influenced by ground-to-ground propagation effects, since the elevation angles are low. However, the ground impedance usually contributes little to the SELs at such a distance. The sign change in the level difference discrepancy may also be due to the different direction of flight for the two operations being considered. The airbase usually only changes the active runway direction when the prevailing wind shifts direction and is greater than five knots. The ground-to-ground (Excess Sound Attenuation) propagation model uses a 4 ± 2 knot downwind condition. It is thus hypothesized that atmospheric refraction due to the prevailing wind gradient is the acoustic propagation mechanism responsible for the discrepancy in SEL differences

measured in these cases. This mechanism can account for the fact that aircraft flying south (where the sites are downwind) recorded an SEL difference discrepancy opposite to that of aircraft flying north (with the sites upwind or in calm air). It can also qualitatively account for the magnitude of the level difference discrepancies. However, the hypothesis cannot be proven quantitatively based on the existing measured wind and noise data. The lack of detailed operational information (tracking and power setting) makes it impossible to draw a reliable scientific conclusion. Nonetheless, it is certain that the detailed NOISECHECK methodology has been shown to be able to extract meaningful amounts of scientific information for analysis.

AIRCRAFT FLIGHT TRACK ADJUSTMENTS

The actual flight track used for a particular aircraft operation has a strong effect on the measured individual SELs, and thus the overall DNL, levels at any site. The Probability of Consistency will thus be very sensitive to the flight tracks used for modeling operations with dispersed or uncertain actual flight tracks. Quantitative evidence of this effect was derived for several operation types from the Sites 7 and 8 measured noise data. SEL comparisons made for the C-141 touch-and-gos northbound on the outer VFR loop (1GNC) provided the most prominent example of how individual SEL comparisons of the predicted and measured noise levels made at two sites reveal where the 'typical' operational flight track must have been located.

The Site 8 SEL prediction for the C-141 touch-and-go operations northbound on the outer VFR loop (1GNC) was originally 7.4 dB too high (Table B-4F). The Site 7 SEL prediction for the same operational profile is also 4.3 dB too low (Table B-4D). It is impossible to improve the SEL PoC at both sites by use of any power management adjustment, since any such change can only raise (or lower) both predicted SELs simultaneously. The mutual Sites 7 and 8 measured noise data thus indicated that the modeled flight track must be moved to improve the SEL comparison (and PoC) for this particular operation. Since the use of two site's measured noise levels reveals the direction (lateral offset with fixed altitude) to the source, it will be discussed as an "Application of Noise Intensity Methods" on the following pages.

Flight track adjustments were clearly warranted for several aircraft operations influencing the measured noise at Sites 7 and 3, particularly all C-141 and F-106 flyover operations on VFR patterns (1GNC, 1FNC, 1LNC, 2GND, 2FND, and 2LND). The adjustments were also made on the new missed approach operations and other aircraft landings from closed tracks. Altogether, eleven new landing profiles were added to closed track patterns; and although several do not appear in any of the measured noise contributors listings, they were included to improve the integrity of the AOP model as compared to the MCSS database. The new profiles were added and their performance adjusted by the "Adjustment Methodology used in this Study", (pg 46). The operational profiles which were added were considered to be examples of actual operations having particular multi-site noise correlations, whose effects were considered earlier (pg 43).

Application of Noise Intensity Methods

The actual flight tracking of individual aircraft operations which would normally be available for airbase operational

planning purposes was not available for examination in this study. Thus no experimental evaluation of the nominal profile estimation method (pg 4) was possible. The (two site measurement) noise intensity method revealed the appropriate lateral position of the flight track, given that the altitude profile is known.

It was assumed that the ground locations given (Sites 7 and 8, Figure 3) for the two sites were accurate. These sites were positioned to provide a reasonably accurate assessment of the direction to the flight path actually used. The model of an aircraft's operational altitude would alter the SEL predictions at the two sites due to changes in the respective slant distances. The aircraft operations under study were either in level flight at their cruise altitude, or descending on approach to the runway. The existing operational description of an aircraft's descent was considered to be adequate and therefore left essentially unchanged. The power setting used in the model influences each predicted SEL equally and was used only to accommodate such SEL differences. Thus the lateral position of the flight track is the only operational variable used to adjust the effective direction to the source.

There were seven aircraft operations which contributed a significant amount of noise to either the Site 7 or 8 measured noise levels. The measured SELs and both the former and revised noise level predictions for each operation and site are given in Table 15.

Table 15. Summary of SEL Comparisons Needed for the Noise Intensity Method as Applied to Seven Aircraft Operations

		Site 7 SELs			Site 8 SELs		
	New		Predicted			Predicted	
	Track	Meas	Old	New	Meas	Old	New
1GNC	S	91.7	86.4	92.3	91.4	98.7	91.8
1FNC	S	87.7	<	<	86.6	93.4	86.8
1LNC	U	90.2	dne	93.3	80.8	dne	<
2GND	T	92.3	88.7	94.5	87.4	<	88.9
2FND	W	87.8	85.5	88.6	88.2	75.6	88.6
2LND	T	90.3	dne	90.4	84.5	dne	84.7
5LND	T	92.0	dne	93.3	88.5	dne	87.8

NOTE: dne = SEL does not exist, since the operation was not previously modeled. The tracks indicated above are plotted in Figure 8. The measured noise levels are those resulting after several corrections were made to the MCSS database, as discussed in the next section (pg 66).

The measured ^SEL difference between Sites 7 and 8 was the quantity used to indicate the appropriate location of each aircraft's operational flight track. The operations which needed such adjustments were divided into two groups which differ in one regard. The C-141 operations (1_NC) were operated in a pattern which includes a "base leg", that is, an essentially straight flight track segment prior to turning for the final approach (see Figure 8). This straight flight track segment was located between the two sites in such a manner that the inverse square law of noise propagation (pg 50) was appropriate. However, the F-106 and F-15 operations (2_ND, 5LND) had been formerly mapped to a flight track which involved a continuous turn in the vicinity of the sites. This pattern was modified in the simplest way possible which would allow the aircraft to fly close to Site 8. The Sites 7 and 8 noise levels predicted for such an operation also included a turn correction function to account for the fact that the aircraft was near Site 7 much longer than it was near Site 8. The flight track location (turn radius) was adjusted using an iterative approach to accommodate the turn correction function's effect on predicted SELs.

Sites 7 and 8 measured noise levels for the C-141 flyby and touch-and-go operations (1GNC, 1FNC) were very nearly equal. The assigned flight track (34S) was therefore moved 1500 feet north so that it was located about halfway between the two sites. A minor power setting decrease for these operational models was also made. The Site 7 to 8 ^SEL difference for the C-141 landing operation was 9.4 dB, so its flight track (34U) was moved another 1000 feet north to approximately accommodate the ratio of propagation distances needed to produce this noise level difference.

Sites 7 and 8 measured ^SEL differences for the F-106 touch-and-go and landing operations were very nearly 5 dB; while the F-15 landings produced about 3.5 dB noise level differences. These operations were all assigned to a flight track (34T) which circled around Site 7, such that the closest approach to Site 8 was almost the same as for Site 7. This flight track was determined after examining the predicted SELs which resulted from operations on similar flight tracks. [Examination of the area map, Figure 9, shows that the Fort Lewis Military Reservation boundary widens considerably about 8000 feet south of the runway. Thus it is plausible that the F-106 aircraft had swung wide during turns to approach the runway, without producing a significant noise level increase in the nearby community.] The F-106 flybys produced ^SELs which were nearly equal, which could only be accommodated by a flight track passing much closer to Site 8 (34W). The appropriate flight tracks are plotted in Figure 8.

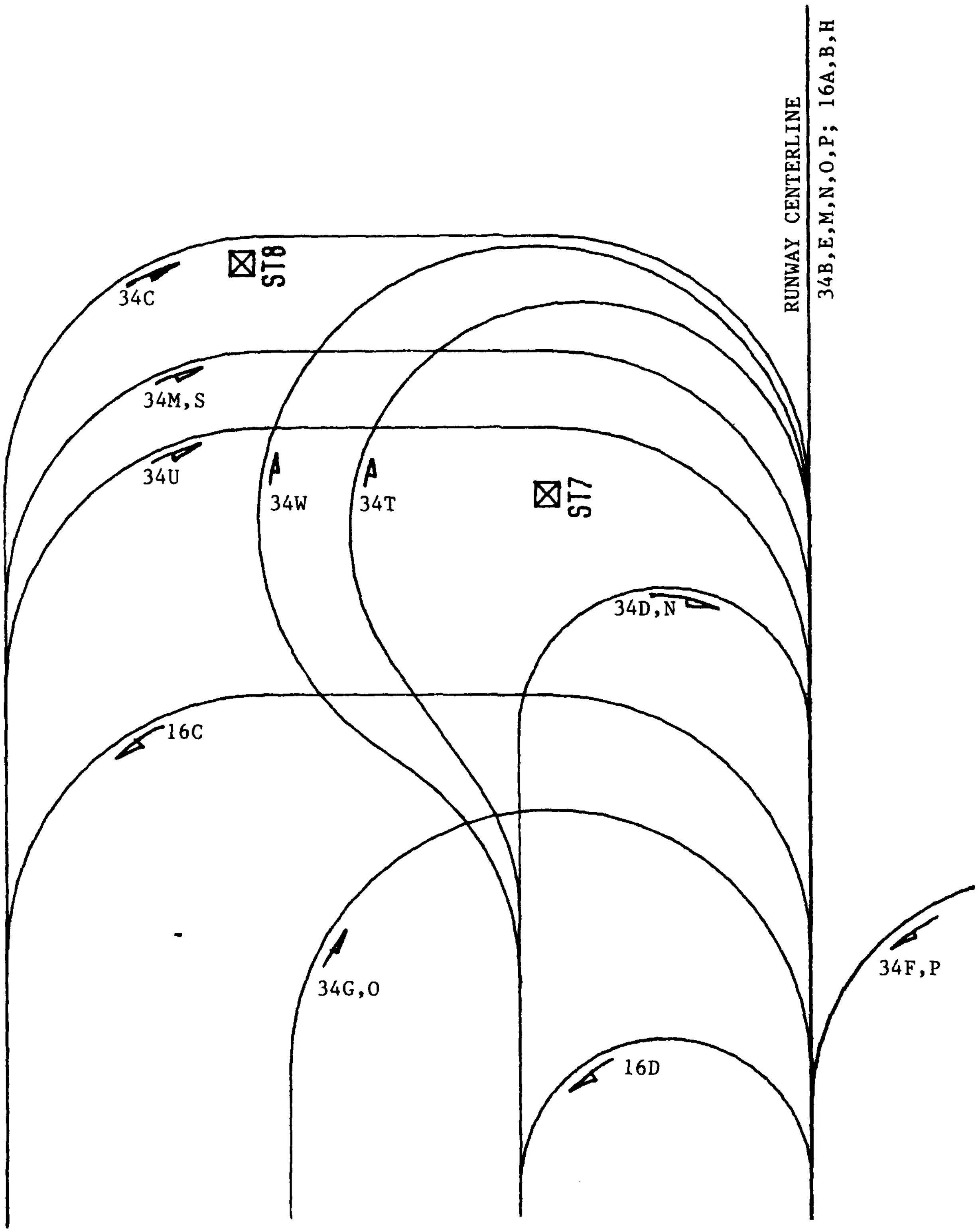


Figure 8. Map of Flight Track Revisions Near Sites 7 & 8

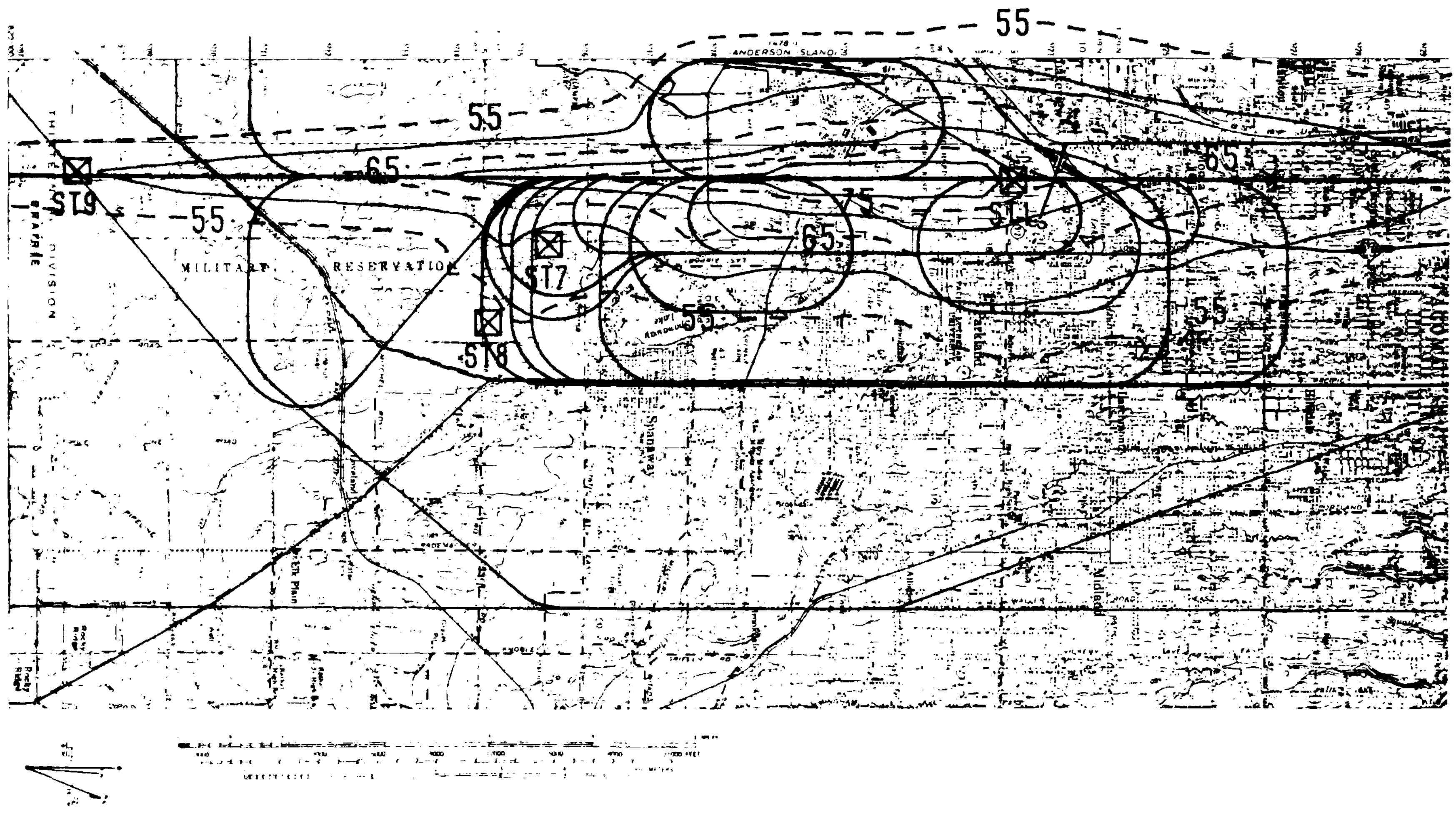


Figure 9. Final NOISEMAP Predicted DNL Contours Overlaid on the McChord AFB Regional Map

Flight Tracks Added or Moved

Four new missed approach flight tracks were eventually added, three of which (34N, 34O and 34P) are mapped identically to existing closed patterns (34D, 34G and 34F, respectively) with an extension straight out to the south for the approach part of the pattern (see Figures 6 and 9). Missed approaches by the F-106, F-15, and T-33 aircraft were accounted for on the 34N track, and only the C-141 appeared on the other two tracks. Another missed approach flight track (34M) was used to accommodate the C-141 missed approach operations which proceed on the outer VFR pattern (1MNC). The results of including these operations were discussed previously (pg 43).

Six new closed track patterns were eventually called for: 16Q, 34Q, 34S, 34T, 34U and 34W. Straight-through flyby and touch-and-go operations were mapped to the 16Q and 34Q tracks. These had previously been mapped to the 34A or 16H departure tracks, which was an obvious source of error at Site 9 (see pg 43). The 34S and 34T closed tracks were added to accommodate the C-141, F-106, and F-15 landing and touch-and-go operational profiles on the VFR patterns (Tables B-4D and F). It was also necessary to add tracks 34U and 34W to model similar C-141 landings and F-106 flybys, respectively. These tracks were added and moved as discussed in the previous section and are shown in Figures 8 and 9. The F-106 missed approaches (2MND) could have been modeled on a new track resembling the 34T track, but the existing predictions were deemed adequate since it was not a dominant contributor. The 34M approach track mentioned previously closely matched the 34S track developed for similar operations.

Finally, it was desired to accommodate the F-106 "straight-in" approach operations (2LNE) on a track which would predict the nearly identical ^SELs measured at Sites 7 and 8 (Tables B-4D and F). Since the MAN-Acoustics data collection notes indicated that flight track type E was assigned to a landing whose origin was unknown, considerable latitude for adjustment to its operational flight track was assumed. Thus a track (34V) was used which runs equidistant from Sites 7 and 8, and still passes over Site 9. The timing of the Site 7 and 8 events indicate that the aircraft may have conducted undocumented holding pattern circles near the measurement sites.

The initial version of the MCSS database Site 8 contributors list included the F-106 conducting flybys on an overhead approach track (2FNG, Table B-4F) reserved for C-141 aircraft. This fact came to light during the ongoing detailed examination of the database, as interpreted by the ^SEL analysis. The database records were revised to include these operations correctly with the F-106 flybys on the

inner VFR pattern (2FND). This revision also included several individual noise events which had been 'commented out' of earlier ^SEL analyses. These operational noises had been previously thought to be too loud to be produced by aircraft on the associated operational flight tracks. It was also noted at this time that a large number of night-time (unlogged) noise events had been erroneously included under the "X" AORT code (Tables B-4D and F). The appropriate MCSS database field definitions were modified to correct this error. The ^SEL analysis associated with the MCS4 model version included all these events as indicated (Tables B-5D and F).

Effects of Flight Track Distribution Modeling

The MCS4 Airbase Operational Profiles model was revised and assessed four times in the process of adjusting it to agree with Sites 7, 8 and 9 measured noise data. The last of these revisions is examined in this chapter to summarize the effects of flight track adjustments and to distinguish them from performance modifications which were discussed previously (pg 46). From the PoC calculations shown in Tables B-5C, D, E and F it was possible to estimate the cumulative effect caused by the flight track adjustments (for the operations listed in Table 15). This involves substituting the noise level predictions from earlier (MCS3) AOP model versions into the calculations of DNL_{ct} and the SEL PoC. The DNL PoC was then estimated, as before, by assuming the change in the DNL_c was equal to that calculated for DNL_{ct}. Table 16 summarizes the results of the changes made to the former flight tracks. The influence of lapses in noise measurement or logged data records has not been included in this comparison.

Table 16. Summary of the Effects of Changes in Modeled Operational Flight Tracking on the Probability of Consistency at Two Sites

	DNL_c	DNL PoC	DNL_{ct}	SEL PoC
Site 7 - MCS4 AOP model				
est., former tracking	~56.2	.673	*54.9	.825
final tracking version	57.5	.980	56.2	.806
Site 8 - MCS4 AOP model				
incl. 2 ops on 34C	~56.6	.370	55.9	.268
est., 4 ops on 34D	~51.2	.340	**50.5	.807
final tracking version	52.7	.514	52.0	.980

* 3 landing ops were assumed to generate $DNL_{c,j}$= 40 dB
** Used 2 landing and 1 TG operation with $DNL_{c,j}$= 30 dB

It was necessary to adjust the predicted partial DNL contributions for several operations to levels appropriate

to an interim model having no flight track adjustments. No former AOP model included operational profiles for landings from closed tracks. These operations were mapped on the adjusted model flight tracks, so it was inappropriate to neglect them in this comparison. Such landing operations were also considered when estimating the "Effects of Distinguishing Logged Operations with Particular Multi-Site Noise Correlations" (pg 43).

The Site 7 DNLs were increased by each adjustment to flight tracks, giving a cumulative 1.3 dB level difference (.7 dB, if landings were not considered). This was consistent with the fact that noise exposure is greater inside a turn, even though the aircraft was further away, and that the other flight tracks were moved much closer to Site 7. The Site 8 DNLs decreased by 1.5 dB due to the flight tracks of two operations moving away from (directly overhead of) the site, and increased by 3.9 dB when the innermost VFR pattern was moved much closer to the site. These changes altered the shape of the overall contour in the area (see Figure 10) as discussed on page 78.

Discrete aircraft flight track models represent many actual flight tracks dispersed across the area. Many individual operational noise measurements showed detailed effects of dispersion in their comparatively high confidence intervals at Sites 7 and 8, relative to Sites 1 and 9. The Site 7 and 8 noise data could have been used to support a multi-track dispersion model for several individual operations. No such effort was undertaken during this study since it could not improve the SEL PoC at either site.

Proper flight track modeling is an important aspect of the AOP Model for basewide noise surveys, or for predictions of airbase noise contours for compatible land use planning purposes. It is especially important that the flight track dispersion be accurately modeled for the very noisy aircraft that can dominate the total noise exposure or strongly influence noise sensitive ground locations.

MEASURED NOISE DATA CORRECTIONS

There are a variety of technical and logistical difficulties often encountered during airbase noise measurement studies. Such problems typically fall into two categories. One category includes measured noise events which cannot be correlated to a logged aircraft operation. The other is that individual noise monitors fail for whatever reason, so no noise events are recorded for known aircraft operations.

Methods Used for Two Types of Corrections

For measured noise events which cannot be correlated to logged aircraft operations, a summary of all such events must be segregated from the operational and measured noise database. A method for deriving such a summary from the current database is discussed in Appendix A (pg A-6). The SELs which do not correlate with logged operations are removed from their respective HNLs by acoustic energy subtraction to arrive at an adjusted HNL which no longer includes the effects of unknown noise source measurements. Since each recorded HNL may include many other logged noise events AND the accumulated background noise, it is preferable to subtract the undocumented noise events than to recalculate the noise from the known events.

This method worked well for most measured adjustments, with the following exception. An extremely loud noise event can, if the other SELs during the hour are low, thoroughly dominate the associated HNL such that if energy subtraction is used, the adjusted HNL will be quite inaccurate due to roundoff error. This situation occurred at Site 8 on 12 February at 9:14 a.m., when a single 1[illegible]6.[illegible] dB event was recorded. No aircraft were in the vicinity at the appropriate time. [It is supposed that this noise event was caused by an off-road vehicle, or perhaps by an undocumented aircraft near the airbase.] This noisy artifact was not included in the DNL_m calculation since it would increase the DNL_m by about 5 dB at Site 8. The acoustic energy subtraction method created significant errors due to the fact that the remaining noise events contributed <.2 dB to the measured HNL. The energy subtraction method would lower the recorded HNL of 81.1 dB to 66.5 dB, which is still too high to be caused by the two other noise events (75.5 and 76.8 dB) recorded during the hour. Using energy addition for these two events gives an HNL of 43.6 dB. Although this is a reasonably accurate figure, it does not include the contribution of noises below the 65 dB threshold. Examination of other hourly HNLs which included two similar noise events indicated that 47 dB was more appropriate, so this figure was used. The effect on the DNL_m due to this 3 dB level difference (at the low noise level) was negligible.

To account for the times during which no noise data were recorded requires that several parts of the PoC analysis be checked for accuracy. Calculation of the adjusted DNL for each day already accounted for the hours having no measured HNL by using the background noise level for the appropriate hours (Tables 6D and H). The final DNL_m calculation requires that only the actual number of operations occuring during the active site measurement hours be used. This was easily obtained from a count of operations within the MCSS database. The (revised) actual number of operations for each day ($N_F(n)$) was used to normalize each day's measured DNL to the effective number of operations per day used in NOISEMAP (N_{NM}), as noted in Tables 19A and C. N_{NM} was derived during this study from a short-term average of the number of operations per 12-hour measurement day.

Accounting for noise monitor malfunctions also required that the NOISEMAP modeled number of aircraft operations per operation type per day (N_j) be used to calculate the measured partial DNL per operation type ($DNL_{S,i}$). This, in effect, normalized DNL_S (Equation 2.4, Table 7) to N_j. For those sites which had no noise monitor malfunctions, N_j had been set equal to the database count of average number of aircraft operations per operation type per day (N_i). This adjustment was easily implemented within the appropriate spreadsheets used for both PoC comparison calculations.

Effects of Measured Noise Data Corrections

There were many uncorrelated noise events at both Sites 8 and 9. Although there were several undocumented noise events at Sites 1 and 7 also, they were all at much lower noise levels than that from the dominant logged aircraft operations and thus had an insignificant effect on the measured DNLs. Correcting for the total effect of the unknown noise source events at Site 9 reduced the DNL_m by .33 dB. Although this was a very small change in the overall DNL, it raised the DNL PoC from .81 to .91, as summarized in Table 17. Based on the timing and acoustic levels of many of the events occurring at Site 9, it is believed that they were caused by undocumented aircraft holding patterns. The Site 8 correction for unknown noise source events produced a .16 dB decrease in the DNL_m, and a slight improvement in the DNL PoC, from .514 to .550 (which does not include the effect of removing the loud anomolous event discussed above). The reason for this low consistency is discussed in the following section. The uncorrelated noise events which were segregated out of the database for Site 9 are listed in Table 18 as an example, and the adjustments made to the respective HNLs appear in **dark** print in Tables 19B and D (compare to Tables 6F and H).

Corrections in the actual number of daily operations ($N_F(n)$) used to normalize the DNL_m and DNL_S calculations were

carried out for Sites 7 and 9. There were 10 hours of measured noise data missing at Site 9 on the first day (11 Feb) of the study. Site 7 experienced several shorter breakdowns (the printer tape often jammed) throughout the study period (see Tables 6D and H). The $N_F(n)$ count was altered as documented in **dark** print in Tables 19A and C (compare to Tables 6C and G). The AOP model's N_j was substituted for the database count N_i, which increased the DNL_S as shown in Table 17. The SEL PoC increased from .80 to .98 due to the adjusted figures. However, the similarly revised $N_F(n)$ for Site 9 produced a .3 dB increase in the DNL_m, which resulted in a DNL PoC decrease from .91 to .74. Both Site 7 PoCs were similarly influenced by corrections to operational counts, as shown in Table 17 below.

Table 17. Summary of Effects on the DNL and SEL PoCs Due to Measured Noise Data Corrections

	DNL_m	DNL_c	DNL PoC	DNL_S	DNL_{ct}	SEL PoC
Site 7- MCS4 AOP						
final version	57.6	57.5	.980	55.6	56.2	.806
+ #ops corr.	58.1	57.5	.816	55.8	56.2	.874
Site 8- MCS4 AOP						
final version	54.8	52.7	.514	52.1	52.0	.980
+ HNL corr.	54.6	52.7	.550	52.1	52.0	.980
Site 9- MCS4 AOP						
final version	60.4	59.9	.807	59.3	59.6	.802
+ HNL corr.	60.1	59.9	.914	59.3	59.6	.802
and #ops corr.	60.4	59.9	.738	59.6	59.6	.980

Table 18. Site 9 Unknown Noise Source Data

Date	Obs. Time	AORT	SEL	Meas. Time	Comment
11	175700	8LNE	83.9	175409	can't use
11	180230	4LNE	83.4	175944	can't use
12	103830	1R	84.9	104628	SAVD evt
12	0	X	92.4	112122	4 evt
12	0	X	89.6	123456	
12	0	X	96.4	155341	3 evt
12	161205	4TNB	92.1	160635	SAVD evt
12	0	X	76.8	191410	
13	93436	4TNA	92.4	93002	SAVD 2 evt
13	0	X	79.9	103124	2 evt
13	0	X	92.9	195021	
13	0	X	98.6	195133	
14	0	X	82.2	152945	
15	0	X	86.9	80610	
15	85200	4TSA	88.8	81247	LOG T err
15	154035	1R	80.6	154253	SAVD evt
18	0	X	85.8	93030	
18	0	X	74.5	101127	
18	0	X	72.3	101604	
18	0	X	79.9	113723	
18	0	X	73.8	151414	
19	123509	1R	84.5	122823	SAVD evt
19	0	X	81.3	155959	
20	0	X	86.8	92434	
20	0	X	97.6	135126	2 evt
20	0	X	97.0	145048	
20	0	X	92.5	145600	
20	0	X	88.9	145733	
20	160032	4R	81.1	160334	SAVD evt
20	163457	4R	74.1	162842	SAVD evt
20	171458	X	72.1	163117	SAVD evt
21	133159	4R	83.1	131233	SAVD evt
22	0	X	79.3	120728	UNK
22	0	X	73.5	120919	UNK
22	0	X	86.1	132935	
22	0	X	87.4	141104	4 evt
22	0	X	92.2	151405	3 evt
22	0	X	88.6	151741	
22	0	X	83.8	152730	
22	0	X	81.7	154249	
22	0	X	78.1	154433	
22	0	X	73.5	154635	
22	0	X	93.8	195844	SAVD1>HR21
25	0	X	74.4	100547	
25	0	X	71.5	101904	
25	0	X	82.5	105212	
25	0	X	94.9	105724	
25	0	X	81.9	105831	
25	0	X	80.4	110150	

Table 18, continued

Date	Obs. Time	AORT	SEL	Meas. Time	Comment
25	115543	4R	82.7	110215	SAVD 1 evt
25	0	X	96.0	155024	
25	0	X	84.9	171338	
26	82650	XGSB	82.7	82530	NO
26	0	X	93.7	91441	
26	0	X	80.8	93408	UNK
26	0	X	89.1	94239	
26	0	X	81.6	101932	
26	0	X	94.7	102829	
26	0	X	78.6	105235	2 evt
26	0	X	81.9	110746	
26	0	X	88.2	110914	
26	0	X	83.6	111230	
26	0	X	96.3	111307	
26	0	X	89.8	111626	
26	0	X	94.9	111844	
26	0	X	87.4	112058	
26	0	X	86.4	112340	
26	0	X	100.0	112525	
26	0	X	83.0	115909	
26	132037	X	87.1	134529	SAVD evt
26	132037	X	87.6	134645	SAVD evt
26	0	X	99.6	134825	2 evt
26	135056	X	95.3	135311	SAVD evt
26	135056	X	86.1	135736	SAVD evt
26	0	X	87.8	140514	A/C?
26	0	X	91.9	140856	A/C?
26	141313	1R	85.6	140947	A/C?
26	0	X	80.6	192016	UNKor1GNC?
27	0	X	78.0	82701	
27	0	X	79.2	82741	2 evt
27	0	X	73.1	82843	
27	0	X	88.2	94623	
27	0	X	74.9	94709	
27	0	X	83.0	104153	
27	0	X	88.0	114242	2 evt
27	0	X	94.7	115350	6 evt
27	0	X	95.7	120237	4 evt
27	0	X	93.6	121945	
27	0	X	84.3	144247	2 evt
28	0	X	86.0	140414	4 evt
28	0	X	91.1	161727	4 UNK evt
28	0	X	87.1	173121	
28	0	X	91.5	193837	

NOTE: Events commented "can't use" occurred at the end of a period in which the noise monitor was malfunctioning. Events commented "SAVD evt" were entered into the database, in an uncorrelated fashion, for analysis.

Table 19A. Revised Measured Energy Averaged DNL Computation for Site 7

N_{NM}=117	Eq. #:		1.1		1.2		1.3	1.3
			Meas	Est.			DNL	
	Qty:	Date	DNL	DNL_{BG}	DNL'	$N_F(n)$	Adj.	DNL_n
		2/11	53.4	35	53.3	92	1.0	54.4
		2/12	53.0	35	53.0	61	2.8	55.8
		2/13	55.1	35	55.0	98	0.8	55.8
		2/14	55.8	35	55.8	75	1.9	57.7
		2/15	51.2	35	51.1	**47**	4.0	55.1
		2/18	55.5	35	55.5	30	5.9	61.4
		2/19	58.3	35	58.3	196	-2.2	56.1
		2/20	59.9	35	59.9	**169**	-1.6	58.3
		2/21	55.6	35	55.6	**57**	3.1	58.7
		2/22	58.0	35	58.0	115	0.1	58.0
		2/25	55.0	35	55.0	**60**	2.9	57.9
		2/26	59.9	35	59.0	**123**	-0.2	59.7
		2/27	58.2	35	58.2	**103**	0.6	58.8
		2/28	63.9	35	63.9	211	-2.6	61.3
		2/29	54.7	35	54.6	115	0.1	54.7

Table 19B. Revised Measured HNLs at Site 8

Date:	2/11	2/12	2/13	2/14	2/15	2/18	2/19	2/20
DNL=	56.7	47.7	50.9	52.0	49.8	50.3	54.2	58.8
Hour								
0800-0900	41.8	45.6	49.1	51.6	45.7	49.0	51.9	63.3
0900-1000	43.5	**47.0**	51.9	**63.7**	47.7	59.0	52.8	58.8
1000-1100	42.4	42.3	**43.2**	55.2	50.9	54.0	54.9	50.5
1100-1200	41.4	40.4	44.0	48.6	51.5	**52.7**	58.2	53.7
1200-1300	49.5	49.1	48.8	47.0	53.0	44.1	52.3	49.3
1300-1400	56.3	50.8	53.2	47.8	50.5	52.7	59.1	57.4
1400-1500	61.9	51.3	52.5	43.0	46.6	46.3	53.1	54.2
1500-1600	68.7	**52.7**	54.7	47.3	44.0	44.7	62.1	70.9
1600-1700	61.2	56.1	61.1	55.1	56.8	51.6	56.9	48.9
1700-1800	47.8	46.1	51.1	48.2	49.1	44.1	55.2	53.7
1800-1900	45.5	42.7	51.4	42.0	57.0	44.1	57.1	59.1
1900-2000	43.7	40.7	49.1	33.9	52.6	**56.6**	57.7	53.4
2000-0800	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

NOTE: **Dark** numbers indicate the data which was altered as discussed in the text.

Table 19B, continued

Date:	2/21	2/22	2/25	2/26	2/27	2/28	2/29
DNL=	58.6	53.6	51.7	56.7	53.0	58.3	51.2
Hour							
0800-0900	40.3	51.9	57.9	58.5	**54.4**	**57.7**	47.7
0900-1000	46.8	43.3	61.5	**61.0**	50.1	**58.8**	**52.9**
1000-1100	55.0	44.3	49.4	59.7	52.3	**55.7**	**50.8**
1100-1200	52.1	54.5	49.1	**50.3**	53.9	55.8	49.8
1200-1300	67.7	53.8	54.4	62.7	**52.1**	**57.0**	47.3
1300-1400	54.2	62.1	50.2	55.9	53.6	64.3	**53.7**
1400-1500	49.7	46.3	**51.1**	**59.9**	59.7	65.5	44.4
1500-1600	56.1	**53.7**	51.7	**51.3**	61.7	58.0	48.5
1600-1700	66.6	50.4	51.2	59.0	55.8	**64.6**	54.1
1700-1800	67.1	**50.5**	49.4	54.7	54.9	60.7	62.1
1800-1900	49.4	62.9	49.2	51.9	52.4	61.1	47.4
1900-2000	48.1	55.9	50.8	65.1	46.1	59.8	47.3
2000-0800	35.0	35.0	35.0	35.0	35.0	35.0	35.0

Table 19C. Revised Measured Energy Averaged DNL Computation for Site 9

	Eq. #:		1.1		1.2		1.3	1.3
N_{NM}=117			Meas	Est.			DNL	
	Qty:	Date	DNL	DNL_{BG}	DNL'	$N_F(n)$	Adj.	DNL_n
		2/11	46.1	35	45.7	**6**	12.9	58.6
		2/12	55.1	35	55.0	61	2.8	57.9
		2/13	60.6	35	60.6	98	0.8	61.3
		2/14	58.6	35	58.6	75	1.9	60.5
		2/15	59.1	35	59.1	71	2.2	61.3
		2/18	53.5	35	53.4	30	5.9	59.3
		2/19	63.6	35	63.6	196	-2.2	61.4
		2/20	61.7	35	61.7	175	-1.7	59.9
		2/21	59.2	35	59.2	138	-0.7	58.5
		2/22	58.9	35	58.9	115	0.1	59.0
		2/25	61.8	35	61.8	94	1.0	62.8
		2/26	62.8	35	62.8	152	-1.1	61.6
		2/27	62.6	35	62.6	132	-0.5	62.0
		2/28	62.1	35	62.1	211	-2.6	59.5
		2/29	54.5	35	54.4	**42**	4.5	58.9

Table 19D. Revised Measured HNLs at Site 9

Date:	2/11	2/12	2/13	2/14	2/15	2/18	2/19	2/20
DNL=	46.1	55.1	60.6	58.6	59.1	53.5	63.6	61.7
Hour								
0800-0900	35.0	56.8	63.7	61.1	**57.4**	42.9	64.9	63.4
0900-1000	35.0	55.3	**68.3**	64.9	62.4	**59.3**	66.5	65.9
1000-1100	35.0	**55.7**	**48.1**	59.6	59.7	**56.2**	57.9	57.7
1100-1200	35.0	**46.2**	61.7	61.6	62.8	**52.0**	67.1	48.4
1200-1300	35.0	**57.6**	62.0	44.9	57.9	43.8	**65.1**	66.1
1300-1400	35.0	60.7	61.4	61.5	61.2	62.7	66.5	**69.4**
1400-1500	35.0	56.8	57.4	50.6	62.2	42.1	67.5	**63.5**
1500-1600	35.0	**58.9**	66.0	**59.0**	**44.1**	**43.6**	68.3	67.9
1600-1700	35.0	**64.6**	65.8	66.9	67.7	61.5	59.0	**58.2**
1700-1800	35.0	54.1	59.9	63.9	62.6	38.9	65.0	63.3
1800-1900	58.0	41.3	62.6	57.9	64.4	46.2	68.4	61.0
1900-2000	42.7	**45.2**	**63.7**	36.4	53.2	53.6	70.2	65.1
2000-0800	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

Date:	2/21	2/22	2/25	2/26	2/27	2/28	2/29
DNL=	59.2	58.9	61.8	62.8	62.6	62.1	54.5
Hour							
0800-0900	41.5	52.3	66.8	**62.4**	68.0	67.4	35.0
0900-1000	51.3	58.9	62.7	**68.0**	**62.6**	67.1	35.0
1000-1100	49.7	57.3	**56.8**	**67.4**	67.2	69.0	35.0
1100-1200	60.4	61.6	**55.6**	**55.0**	**63.4**	64.9	35.0
1200-1300	65.0	**62.3**	68.5	54.4	**64.0**	65.1	35.0
1300-1400	**61.4**	**61.4**	67.1	**62.4**	67.1	63.1	35.0
1400-1500	63.1	**58.9**	66.0	**67.4**	**65.7**	**62.6**	35.0
1500-1600	62.5	**63.7**	**66.7**	67.3	68.0	65.3	60.6
1600-1700	65.2	54.1	64.9	65.0	66.7	**63.6**	62.6
1700-1800	67.1	57.1	**53.3**	67.8	66.3	**58.4**	64.0
1800-1900	60.1	60.0	58.4	67.5	59.8	60.6	51.2
1900-2000	56.9	**68.7**	65.9	65.5	47.1	**63.4**	59.1
2000-0800	35.0	35.0	35.0	35.0	35.0	35.0	35.0

Cumulative Effect of Low-Level Noises

The very low DNL PoC at Site 8 (see Table 17) is considered to be a symptom of the cumulative effect of many low-level noises experienced at the site. These low-level noises include the cumulative contribution of many minor (i>18) noise contributing operations (which may not be modeled accurately), wind noise which could not be included in the measured noise data correction, and any inaccuracy in the estimate of normal background noise levels. The effect of ambient noise is known to decrease the reliability of low-level (<55 dB) DNL predictions and their applicability to environmental assessments (Ref. 11, pg 12).

The cumulative measured DNL_s includes the noise energy from the top 18 measured noise contributing operations, whereas the DNL_m includes all measured noise regardless of the source. The overall DNL_c includes contributions from all modeled noise contributing operations. If the predicted cumulative DNL_{ct} (which includes the top 18 predicted noise contributing operations) equals the DNL_s, then the level differences between DNL_c and DNL_m represent the noise contribution from low-level noises, regardless of origin. Table 20, below, summarizes these level differences and their effect on the DNL PoC. It is apparent from this comparison that the cumulative contribution of low-level noises (including underestimation of source noises below the top 18 predicted noise contributing operations) have an increasing impact on the DNL PoC as the actual DNL_m decreases.

Table 20. Estimate of the Cumulative Effects of Low-level Noises on the DNL PoC.

	DNL_m	DNL_c	DNL PoC
Site 1	78.8	78.3	.858
Site 9	60.4	59.9	.738
Site 7	58.1	57.2	.731
Site 8	54.6	52.7	.550

NOTE: The SEL PoCs were forced to be greater than .97 so that this comparison was valid. Thus the former DNL_cs for Sites 1 and 8 were artificially adjusted (without AOP model revisions) by the amount of the level difference between the final MCS4 prediction of DNL_{ct} and the measured DNL_s.

Table 20 shows the deterioration of the DNL PoC with decreasing DNL. This confirmed the position stated in Reference 11 that a low degree of confidence should be associated with low DNL values (i.e. $\lesssim$ 55 dB in this case), particularly in regions (Site 8) where many different dispersed aircraft operations are involved. The fact that many such operations contributed nearly equally to the overall noise level made it increasingly difficult to create an accurate operations model for noise prediction in the vicinity.

SUMMARY OF DEVELOPMENTAL RESULTS

DISCUSSION OF RESULTS

This analysis of McChord AFB measured noise data has produced several findings relevant to the process of creating an Airbase Operational Profiles Model and the prediction and analysis of site-specific aircraft noise levels. The quantitative assessments of effects on measured noise data from variations in military aircraft flight operations provided insight into several important aspects of airbase operations modeling.

Operational Profiles Modeling

It has been shown quantitatively that the noise produced by aircraft operations is quite sensitive to the parameters of aircraft operational profiles (engine power setting, altitude, and airspeed) and to the location of the flight tracks describing those operations. In this study, limited information regarding power management, airspeed, or flight track location was available. The operational altitude data used was taken from tower log records for many individual flyby operations and was directly applied to several flyby profile models. An airbase environmental planner has access to detailed information which must be organized into a realistic model of actual aircraft operations. Such a modeling effort should consider the recommendations of earlier researchers (Ref. 16), aircraft operational data reduction techniques (pg 4), and the effects of changes in the airbase operations model documented in this study.

The weather parameters (temperature and relative humidity) used to typify the airbase environment were shown to have a significant impact on the noise level predictions. Since atmospheric absorption effects are distance dependant, this effect was more pronounced when the dominant noise contributing operation was at long propagation distances (typically those greater than 1000 ft).

Grouping different aircraft operations together was shown to be risky, particularly if the aircraft involved had significant differences (>4 dB) in the noise levels they generate. Grouping of operations which follow different flight patterns, or use significantly different departure profiles was also shown to be a source of error. Use of default operational profiles was valuable for modeling of transient aircraft operations, except in the case of loud aircraft such as the C-135A. This aircraft's departure was a dominant noise contributing operation whose predicted noise levels were (and are) sensitive to the operational parameters used.

Different operational parameters have varying degrees of effect on the noise produced at the ground locations considered in this study. The power management for takeoff operations dominated the cumulative measured noise levels at Site 1, located just beyond the end of the most frequently used runway. Adjustments to power setting and the associated distance to the initiation of climbout (altitude over Site 1) accounted for an improvement in the Site 1 DNL Probability of Consistency from .51 to .91. Power setting (and corresponding airspeed) adjustments accounted for an improvement in the Site 9 DNL PoC from .73 to .98. The highly repeatable approach operations of the C-141 dominated the overall Site 9 noise levels. The improvement in the DNL PoCs cited here is based on the total impact of the operational model changes (1.2 and 1.9 dB DNL at Sites 1 and 9, respectively) being subtracted from the optimized model results. No large changes in power setting were used in this study.

Dispersion of actual aircraft flight tracks can easily cause significant (~3 dB) measured noise level differences in comparison to the noise propagated laterally to the side of aircraft flying on designated flight tracks (Ref. 16, pg 127). This effect was quantitatively demonstrated from the Sites 7 and 8 measured noise data. Level differences of up to 7 and 13 dB were shown to be caused by (1500' and 4000') inaccuracies in the original nominal flight track layout. The actual dispersion relation of individual aircraft operations in the vicinity of Sites 7 and 8 was difficult to determine from ground-level measured noise data only. However, the dispersion of flight tracks for similar operations was distinguished by use of site-to-site noise level comparisons ("Noise Intensity Methods"). The resultant multi-track model is diagrammed in Figure 8. The cumulative impact on noise level contours due to improved operational track modeling is evident in Figure 10. This figure shows the final MCS4 model's optimized predicted contours (shown in solid lines) compared to equivalent contours from the MCS2 model without dispersion modeling, in the area of Sites 7 and 8. The 58 and 54 dB contours were chosen to best illustrate contour changes due to the model revisions.

Dispersion in flight altitude has little effect on takeoff and landing operational noise predictions since they are usually highly repeatable (Ref. 17, pg 140). The Perceived Mean Altitude function was shown to be a very good tool to characterize this parameter for use in flyby operational profile models. Predicted SEL increases of up to 28 dB for specific moderately loud operations were obtained by proper modeling of the altitudes over Site 1. These adjustments

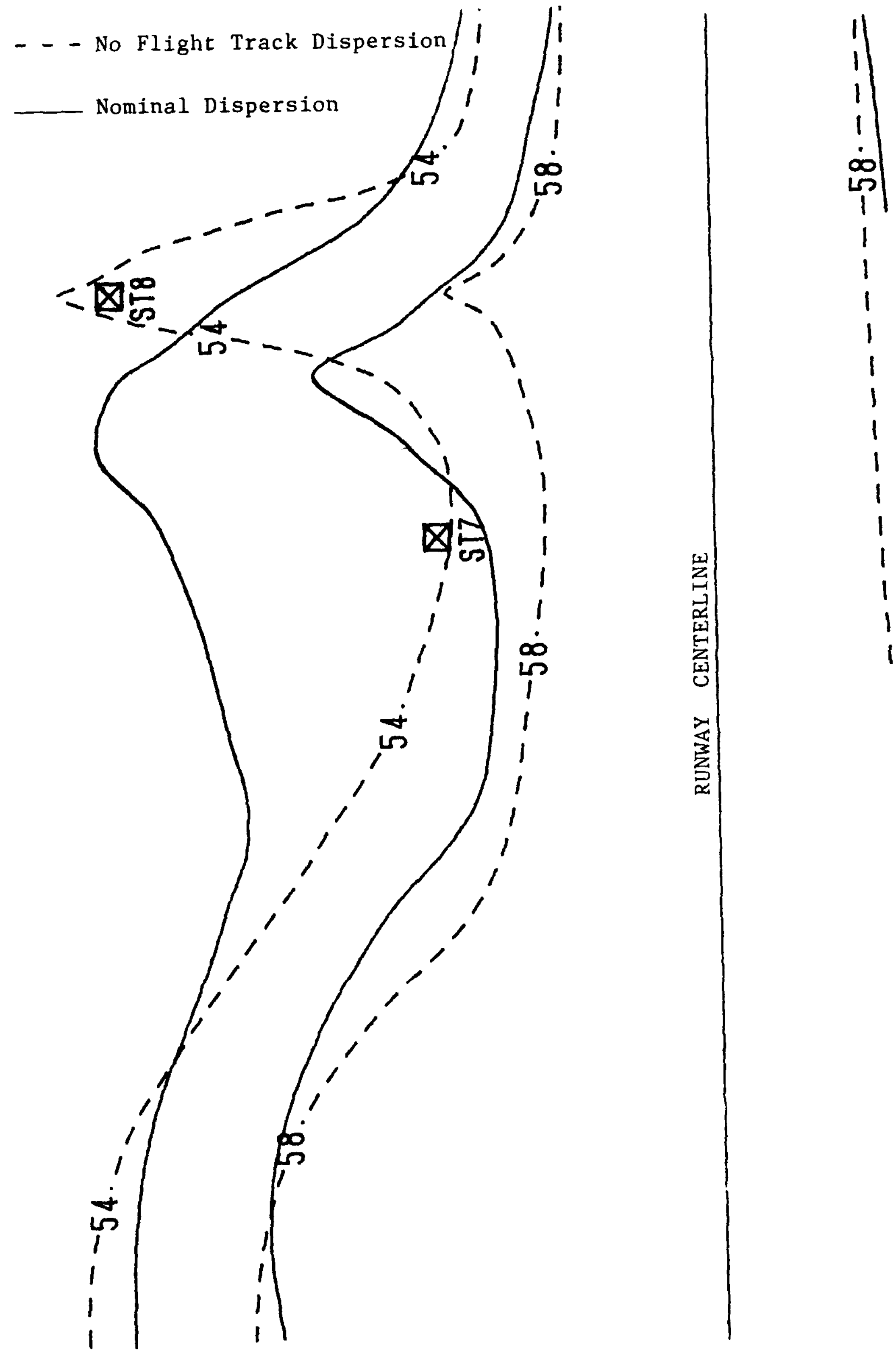


Figure 10. Cumulative Effect of Flight Track Dispersion on DNL Contours Near Sites 7 & 8

produced a 1.1 dB increase in the overall Site 1 DNL, significantly improving the consistency of the AOP model in spite of the dominance of takeoff noises at that location. In areas dominated by the noise produced by flyby operations, accurate characterization of nominal flyover altitudes would be imperative.

Three further operations modeling techniques were developed to appropriately account for specific situations which arise in the course of refining the operations model used: (1) The Perceived Mean Altitude method was used as a basis for "Deriving a Nominal Flight Profile from Aircraft Performance Records"; (2) The start of takeoff roll noise prediction model was disabled to account for noise measurements at ground locations influenced by this noise source; and (3) Takeoff and landing operational profiles (used on closed patterns) were separated when necessary to account for their temporally separate logged operations. This technique is recommended to accommodate the detailed NOISECHECK procedures in future NOISECHECK survey analyses.

Noise Prediction and Analysis

The results of this study strongly supported the NOISEMAP approach to modeling the acoustic generation and propagation problems which must be treated in an airbase environmental noise assessment. The detailed NOISECHECK analysis (SEL comparison) was also validated as a methodology to scientifically verify individual aircraft operational model predictions and thus the noise prediction models inherent in those predictions.

The detailed analysis undertaken in this study quantified the influence of several aspects of the noise prediction and analysis tools being used. The development and use of relatively fast database management tools allowed a thorough quantitative analysis of the measured noise data and model comparisons. The technique used was easily reconfigured to allow improved interpretations of the operational and measured noise database. The flexibility, reliability and speed of the analysis technique can be gauged by the amount of information that was analyzed and the level of detail that resulted.

The analysis of measured noise data in this study included all aircraft operations conducted over the airbase, with the exception of unidentifiable log records. This thorough approach was necessary since it was impossible to predict accurately which operations were significant at all four sites. Several large systematic inaccuracies were thus revealed in the original operations model. However, it was also evident from the repeated modifications of the AOP model, and its predicted partial DNLs, that it was extremely difficult to predict which measured noise contributing

operations ranked in the top 18 at a given site (Appendix B Tables). The rank order of the predicted DNL_js was never identical to the rank order of the equivalent DNL_js. The fact that even an optimized model of aircraft operations did not correctly predict the list of the top 18 measured noise contributing operations further justified the application of a thorough analysis of measured noise data.

The NOISEMAP Take-Off Roll subroutine predicted noise levels that were 4-9 dB higher than the measured noise data for two high-performance, rapidly accelerating aircraft (the F-106 and F-15). This noise level difference was attributed to the correction array applied in the Take-Off Roll subroutine to the ground runup noise level predictions (pg 57), which may not accurately reflect the influence of the "cone of silence" produced at the rear of the aircraft. The available measurements could not, however, provide any information on the high noise levels produced to the side of departing aircraft. The results were considered inconclusive in their impact on general airbase noise level predictions.

Multi-site noise correlations predicted by any aircraft operational profile model greatly aid in conducting a detailed SEL analysis using the NOISECHECK methodology. The following qualitative result pertains to noise prediction modeling and was derived using this type of analysis.

The Excess Sound Attenuation model (Ref. 15) as applied by the new NOISEMAP Lateral Attenuation subroutine (Ref. 14) predicted 5 dB less overall attenuation between Sites 7 and 8 than was measured for the C-141 approach path operations, particularly the more prominent noise producing touch-and-go operations (Table 14). The relatively narrow 95% confidence interval associated with the measured ^SEL for this operation supports the conclusion that lateral dispersion was low for such approach operations. The differences in lateral attenuation due to aircraft type (noise spectrum) may explain part of the level difference discrepancy for the C-141 aircraft and measurements for the F-106 southbound takeoffs. The majority of the problem may be qualitatively explained by the effect of the 4 ± 2 knot downwind propagation model (versus a variable-wind, no-wind, or upwind condition) chosen for the atmospheric refraction aspect of the Excess Sound Attenuation model. The quantitative impact of the chosen atmospheric refraction model (wind condition) could not be addressed in this study.

The DNL PoC was shown to be a sometimes deceptive descriptor of the actual integrity of the model's noise level predictions compared to measurements. Its value as a stand-alone metric to evaluate an AOP model at a given site was degraded when one or two dominant partial DNLs were overpredicted. The DNL PoC may be very good (>.90) even if

significant differences between modeled and actual SELs exist for some important noise contributing operations. This situation occurred during the development of the AOP model, at Sites 8 and 9. At Site 8, the DNL PoC was .98 and the SEL PoC was .76, in spite of a 7.4 dB overprediction of the dominant (i=1) partial DNL. At Site 9, a 3.7 dB overprediction of $SEL_{i=1}$ was accommodated in a DNL PoC of .91 and SEL PoC of .43 (the impact of minor noise contributing operations was greater than modeled). These results give evidence that the DNL PoC cannot be relied on to quantify the overall accuracy of the AOP model. A high DNL PoC could indicate only local consistency of the cumulative AOP model predictions, which may then be inconsistent in areas where poorly modeled noisy operational flight tracks diverge.

There was one indication that some PoC calculations may need to be reconsidered. There were significant differences between the estimated [sample] standard deviation of NOISEMAP predicted DNL Energy ($Sigma_c$) and the equivalent measured quantities ($Sigma_m$ and $Sigma_s$). The $Sigma_c$ of all AOP model versions was always a factor of 2-5 times lower than either $Sigma_m$ or $Sigma_s$ based on measurements at all sites in this study (Tables B-5A, C, E and G). If $Sigma_c$ more closely matched either of the measured [sample] standard deviations of DNL or ^SEL Energies ($Sigma_m$ or $Sigma_s$), the PoC would dramatically improve.

These differences may be attributable to the calculations involved in determining either the predicted or measured standard deviations. The formula used to derive the predicted standard deviation ($Sigma_c$) includes a nomograph (Figure 5, from Ref. 17, Fig. 17) to estimate the SEL variance for each of the top 18 noise contributing operations. This nomograph may be underestimating the actual variance of the respective noise contributing operations. The difference between predicted and measured variance will also be influenced by the fact that the distribution of acoustic energies being characterized may not be a normal distribution (see Ref. 2, pg 114). Furthermore, the formulae used to derive the measured standard deviation ($Sigma_m$) do not normalize out some known physical effects which tend to increase its value. These effects include day-to-day variations in atmospheric absorption and in the number of **dominant** aircraft operations. Assessment of the impact of these effects was not within the scope of this study.

CONCLUSIONS

The McChord AFB noise measurement assessments have given a broad spectrum of lessons learned in regard to many aspects of modeling Airbase Operational Profiles. The effort has also been a valuable alpha test case for NOISEMAP 6.0 development and has provided many insights into the kind and quality of information required during a noise measurement survey for verification of basewide noise predictions. In particular, actual aircraft tracking and performance data needs to be collected throughout the duration of such a noise survey so that the AOP model may be unambiguously derived.

During the course of this study, the value of NOISEMAP 6.0 to efficiently perform repetitive, site-specific assessments of variations in the AOP model was proven. A capability was developed to perform machine-based DNL and SEL PoC comparisons using commercial database management and spreadsheet applications software. The automated approach was validated in comparison to hand calculations. These tools represented a substantial improvement in the automation of methods available to perform NOISECHECK assessments. The application of these tools showed that simultaneous, multi-site NOISECHECK assessments have considerable value for verification of predicted noise exposure level contours and for detailed scientific evaluation of the noise prediction models used. A noise intensity approach to the analysis of noise data from appropriate pairs of measurement sites was adopted, providing significant benefits for modeling of lateral dispersion. An approach to deriving a modeled altitude (PMA) which typifies the average acoustic energy produced by vertically dispersed operations was developed and successfully demonstrated (for flyby operations). An extension of this method was proposed for deriving model profiles to simulate the noise exposure from numerous actual operations including lateral dispersion and variations in power setting.

The central discussion of this effort was concluded by determining the measurable effects which operational parameters had on environmental noise levels. The following summarize the influence each operational profile parameter had on ground level noise exposure:

Engine power setting --

The noise level produced by an aircraft is strongly affected by relatively small changes in engine power setting. For many pure jet aircraft, a 1 dB change in noise level is produced for each 1% change in engine power setting. The actual relationships are computed in the Omega 10 software,

for each aircraft type (note Fig 1). It was important to derive a power setting value which corresponded to the acoustic energy average noise level on the ground, since actual power settings vary somewhat for a given type of operation. This adjustment produced up to 3 dB changes in the predicted noise level. For departure operations, power management (which includes the distance traveled until climbout or power reductions were initiated) produced the most significant adjustments (up to 6 dB) to the predicted noise level.

Flight track dispersion --

The width of measured noise level contours for a specified flight track is strongly dependent on the horizontal dispersion of the actual aircraft flight tracks being modeled. Simulations involving different dispersion relationships (see pg 4 and Ref. 16, pg 135) show 2-3 dB increases in predicted noise level at positions laterally offset (1000 and 3000 feet respectively) from the primary flight track. Dispersion of actual aircraft flights for individual operation types was evident in the measured noise data, although it was not modeled. Dispersion of similar aircraft operations was modeled by moving the ground location of their flight tracks. Such adjustments changed the respective noise level predictions by up to 13 dB.

Effective altitude --

The vertical dispersion of aircraft altitudes was fairly minimal for most types of operations. For those operations which do exhibit large altitude dispersions (flybys and pattern operations in particular), the noise level produced on the ground will vary dramatically. An analytic approach to deriving an effective altitude (Perceived Mean Altitude, PMA) was developed. The resultant increase in predicted noise levels (4-28 dB SEL) significantly improved the consistency of the model near Site 1 (the only area for which valid altitude data were recorded). About one out of seven aircraft flew below the modeled (PMA) altitude. It is concluded that this ratio must hold (in most cases) for the actual flight operations to remain consistent with the operational model.

Airspeed --

The airspeed used in an operational profile is considered to be a (complex) dependent variable of the power setting, altitude, weight, and drag configuration of the aircraft being modeled. The Sound Exposure Level (SEL) produced by an aircraft operation is clearly dependent on the airspeed since this parameter governs the duration of individual noise events. The predicted duration effect is accounted for by a term equal to ten times the logarithm of the ratio

of the reference (NOISEFILE) airspeed to the actual airspeed.

The Probability of Consistency is the basic metric used to indicate the degree of confidence placed on any particular comparison of predicted versus measured noise level or exposure. It has been shown that a very high degree of confidence (PoC $\geq$.8) exists when accurate aircraft operational models are used where the cumulative noise level is moderate to high (DNL $\geq$65 dB). In those instances where many different, highly variable aircraft operations generate a low cumulative noise level (DNL $\leq$60 dB), the degree of confidence will be somewhat lower (PoC $\leq$.75).

RECOMMENDATIONS

This study revealed a variety of technical issues which could not be resolved, within the scope of the effort, using the current techniques. The following recommendations are made to fill technical needs or to promote further research:

Airbase Operational Profiles Modeling --

The results of this effort's NOISECHECK analyses documented the importance of an accurate aircraft operational model in predicting airbase environmental noise. The derivation of the Perceived Mean Altitude (a valid method for determining an operational model parameter from actual operational log records) gives airbase environmental officials a new tool to use in creating accurate aircraft profile models. The method was expanded for the broader purpose of "Deriving a Nominal Flight Profile from Aircraft Performance Records". It is recommended that concerned airbase environmental officers understand the impact which modeled operational parameters have on noise predictions and that they apply the Nominal Flight Profile methodology in noise sensitive situations.

The Nominal Flight Profile method for determining an appropriate model of flight track dispersion may be difficult to apply in some situations. It is recognized that the actual dispersion of aircraft flight tracks will be fairly evident to an operations planner based on spending a day (or more) observing the approach-control radar at the airbase being modeled. Under these circumstances, it is recommended that a multi-track dispersion model of the dominant noise contributing operations be developed from such visual information (for takeoffs in particular and for landings or pattern operations).

Developing an airbase operations model often requires that numerous transient (infrequent) aircraft operations be appropriately included. Often, the performance information needed to create profile models for such operations is unknown to the operations planner. The results of this study indicated that grouping such operations together is complicated and risky. It is recommended that the BASEOPS default profiles for civil or transient military aircraft be used, except in cases where the operation is a dominant noise contributor.

The aircraft operations modeling methodology must be altered slightly during NOISECHECK measurement studies for direct comparison of predicted to measured SELs. It is important that the multi-site noise predictions of all operational profiles be consistent with the results of procedures required by the NOISECHECK measured SEL analysis. Therefore it is recommended that takeoff+landing type profiles used in

BASEOPS to model such portions of closed pattern operations be split into two semi-circuit profiles. The use of two profiles permits a direct correlation between the operations model and the log of such temporally separate noise producing events. This alteration will distinguish separate aircraft movements in the SEL comparison but will not (if properly applied) influence the overall predicted noise level contours.

NOISEFILE Additions --

The Omega software application of a 5 dB limitation on extrapolation of noise level predictions from the NOISEFILE reference conditions created some difficulty in modeling the C-135A approach operations over Site 9. The extrapolation limitation and 3° glide slope contraint left an unresolved 4.3 dB error in the model prediction. It is recommended that this, and other, "downwind approach" operations be studied, and that measurements be made and the noise level versus distance function (and spectrum) be added to NOISEFILE.

NOISECHECK Survey Planning --

A NOISECHECK noise measurement survey can be conducted in a two to four week period if the actual operations occurring during the measurement period are similar to that specified in the BASEOPS model used in predicting the long term average noise contours. Significantly different numbers of dominant noise contributing operations, or weather conditions which seriously influence noise propagation and aircraft performance will introduce larger normalization adjustments which can only decrease the reliability of the results. It is recommended that the operating modes of the airbase be considered in planning a fixed duration NOISECHECK survey, so that the dominant noise producing operations are accurately measured. The Society of Automotive Engineers (SAE) Aircraft Noise Measurement Subcommitte is currently preparing a detailed recommendation for similar airport noise measurement surveys.

Considerable value was derived during this study from site-to-site noise comparisons. The use of simultaneous multi-site noise survey techniques, and in particular, the two-site noise intensity method for source dispersion characterization is recommended for use in future NOISECHECK surveys. It is further recommended that a third lateral monitoring position be added to improve the measurement of unsymmetric lateral dispersion about a flight track, for operations influencing a noise sensitive location.

The NOISECHECK survey protocol includes accurate logging of all operations, including flybys and touch-and-gos, occurring day or night throughout the measurement period.

This enables a complete analysis of predicted versus measured noise events. The analysis of measured noise data during this study further indicated that the predicted top 18 noise contributing operations are unlikely to include all of the measured top 18 noise contributing operations. It is therefore recommended that the NOISECHECK analysis of individual measured noise events not be explicitly limited to those operations in the predicted top 18 noise contributor's list.

The value of the operational and measured noise database for scientific analysis would significantly improve if complete records of all operational parameters were kept. It is recommended that meaningful statistics be recorded for analysis of the effects of engine power setting variations and horizontal or vertical dispersion of aircraft flight tracks on noise level measurements.

NOISECHECK Analysis Execution --

A computer based, machine readable log of all aircraft operations greatly simplifies the process of analyzing the operational database. It is recommended that a menu-driven capability for recording such information be developed and applied to the existing operational database structure. A simple Enable-based input form would be sufficient to provide operational personnel with a familiar format for such record-keeping, and also allow sorting of the records for operational log analysis.

It is recommended that the correlation of measured noise data to the operational log, using the temporal correlation method (pg 39) be automated. This capability will enable a far less time-consuming and more complete analysis of individual operational measured noise levels.

The recommended Airbase Operational Profiles Modeling technique of splitting takeoff+landing operational profiles into two distinct profiles should be undertaken during comparison of the operations model to the NOISECHECK operational noise measurements.

It is also recommended that the NOISEMAP estimated variance nomogram be re-examined based on currently available data. A moderate increase in the estimate would significantly improve the PoC resulting from every comparison in this study. An effort to verify the variance estimate may involve further study of the database used in this study, as discussed below.

BASEOPS Developments --

A computerized method for deriving aircraft flight tracks and distribution models for primary tracks from radar

tracking records is desirable and commercially available. It is recommended that this capability be introduced and that the complete methodology for deriving Nominal Flight Profiles be automated. Automation of these techniques would significantly reduce the effort required in developing viable operational profile models and dramatically increase the defensibility of predicted noise contours. It also opens the possibility of a rigorous validation of the total operations plus noise prediction modeling methodologies.

It is recommended that the methods used to determine the typifying weather at an airbase be included directly within BASEOPS, by addition of an appropriate menu requiring local Climate Summary data. It is also recommended that the details of the current method be studied further for possible technical improvement.

NOISEMAP Model Development --

The Take-Off Roll noise model used by NOISEMAP created large overpredictions of noise levels in a sector to the rear of departing high performance aircraft during this study. The atmospheric refraction (downwind propagation) model incorporated in the Excess Sound Attenuation model may also have produced noise level discrepancies. It is recommended that both of these models be studied for possible improvements, by analysis of a larger, more comprehensive, database than was available in this study. The development of an improved Take-Off Roll model will require that an extensive amount of measured noise data be acquired. The application of a NOISECHECK type approach makes the measured noise data collection problem much more tractible, by allowing analysis of "target of opportunity" noise measurements. However, the fact that the spectra of noise events is not currently available from NOISECHECK measurement instruments means these instruments could not be used to derive improved noise prediction models consistent with existing model derivation methods.

The American National Standards Institute "Method for the Calculation of the Absorption of Sound by the Atmosphere" (Ref. 10) will soon be revised. It is anticipated that the revised standard may gain international acceptance and that a method for determining 1/3 octave band absorption coefficients will be devised. Such a method would be comparable to the Society of Automotive Engineers Aerospace Recommended Practice 866A (Ref. 9), currently in use, and may also be adopted by that organization. It is recommended that an effort be initiated to replace the existing SAE model with a revised ANSI standard, for the purposes of Air Force aircraft noise data reduction and prediction models. Such an effort will require evaluation of the impact of the change and a subsequent complete reanalyses of the existing NOISEFILE measured database.

Further Study of the McChord Measured Noise Data --

A study of the effects which influence $Sigma_m$ should be undertaken by including them in the calculation of the Measured Energy Averaged DNL (DNL_m). The atmospheric attenuation coefficient varies from day to day and has a variable (although small at some locations) effect on each day's measured DNL. It is recommended that an additional step be studied, which would normalize each day's DNL_n to a level which would occur if the day's weather were the same as the weather typifying the measurement period. This step could be based on the existing assumption that the 1 kHz 1/3 octave band absorption coefficient approximates the effect of atmospheric absorption on the partial DNL (Ref. 5).

It is also known that the number of daily dominant noise contributing operations, rather than the number of all daily aircraft operations ($N_F(n)$), tends to correlate more closely with variations in each day's DNL at a specific site. This will be evident when a large number of relatively quiet operations occur on a given day, inflating that day's $N_F(n)$. It is recommended that the calculation of DNL_n (the normalization of each day's DNL to the "average busy day" number of operations, N_{MM}) be studied for possible revision to account for the dominant operational totals.

These last two recommendations would likely have only a small effect on the resultant DNL_m. However, they may significantly reduce the $Sigma_m$ calculated for the measurement period (improving the DNL PoC) by reducing the sources of variation in DNL_n.

REFERENCES

1. Moulton, C. Air Force Procedure for Predicting Aircraft Noise around Airbases: Noise Exposure Model (NOISEMAP) User's Manual. AAMRL-TR-90-011, February 1990.

2. Rentz, P., and Seidman, H. Development of NOISECHECK Technology for Measuring Aircraft Noise Exposure. AMRL-TR-78-125, May 1980.

3. Lee, R. Field Studies of the Air Force Procedures (NOISECHECK) for Measuring Community Noise Exposure from Aircraft Operations. AFAMRL-TR-82-12, March 1982.

4. Lee, R., and Mohlman, H.T. Air Force Procedure for Predicting Aircraft Noise around Airbases: Airbase Operation Program (BASEOPS) Description. AAMRL-TR-90-012, January 1990.

5. Bishop D., et al. Further Sensitivity Studies of Community-Aircraft Noise Exposure (NOISEMAP) Prediction Procedure. AMRL-TR-76-116, April 1977.

6. Raspet, R. Application of the Fast Field Program to the Prediction of Average Noise Levels around Sources. Applied Acoustics, v 27, pg 217-226 (1989).

7. Bolton, D. The Computation of Equivalent Potential Temperature. Monthly Weather Review, v 108, pg 1046- 1053 (1980).

8. Goff, J.A., and Gratch, S. Low Pressure Properties of Water from -160 to 212 °F. Trans. Amer. Soc. Heat and Vent. Eng. (ASHRAE), v 52, pg 95-121 (1946).

9. --- Standard Values of Atmospheric absorption as a Function of Temperature and Humidity for Use in Evaluating Aircraft Flyover Noise. Society of Automotive Engineers Aerospace Recommended Practice (SAE ARP) 866A, August 1964.

10. --- Method for the Calculation of the absorption of Sound by the Atmosphere. American National Standards Institute (ANSI) Standard S1.26, 1978.

11. Speakman, J.D., Powell, R.G., Cole, J.N., and Lee, R. Community Noise Exposure Resulting from Aircraft Operations; Acoustic Data on Military Aircraft. AMRL-TR-73-110, Vols 1-3, November 1977.

12. Mohlman, H. Computer Programs for Producing Single-Event Aircraft Noise Data for Specific Engine Power and Meteorological Conditions for use with USAF Community Noise Model (NOISEMAP). AFAMRL-TR-83-020, p63, April 1983.

13. Mills, J.F. Calculation of Sideline Noise Levels During Takeoff Roll. AMRL-TR-76-123, Appendix, September 1976.

14. Speakman, J.D. Lateral Attenuation of Military Aircraft Flight Noise. AAMRL-TR-89-034, July 1989.

15. Bishop, D.E. Overground Excess Sound Attenuation (ESA): Volume 3. Application of ESA Data in Noisefile. AFAMRL-TR-84-017, p37, April 1985.

16. Galloway, W.J. Community Noise Exposure Resulting from Aircraft Operations: Technical Review. AMRL-TR-73-106, Section IV, November 1974.

17. Bishop, D.E., et al. NOISECHECK Procedures for Measuring Noise Exposure from Aircraft Operations. AFAMRL-TR-80-45, November 1980.

18. Lundberg, W.R. BASEOPS Default Profiles for Transient Military Aircraft. AAMRL-TR-90-028, February 1990.

APPENDIX A: DATA MANAGEMENT

To accomplish the repeated comparisons of models to the McChord database, several data management tools were developed. It is beneficial to have both an efficient and flexible means of determining the ^SELs based on the operational and field measured data, since detailed correlations within the database might be changed and the kinds of aircraft and operations grouped together can be easily modified. The process of calculating a PoC for each site and AOP Model can be greatly simplified by automating the access to *.SPO data and use of a spreadsheet to do the calculations. Use of BASEOPS to generate profiles provides a significant benefit by its simplicity of input and can add flexibility and speed by use of its Subset Edit Menu (Ref. 4). Use of the NOISEMAP Master Control Module Run Options Menu makes it possible to greatly speed up the predictive analysis time by calculating only the Specific Point Outputs (Ref. 1).

The following sections present a detailed discussion of the tools developed during this study to process the Operational and Measured Noise Database obtained at McChord AFB. Most of the steps taken incorporate the standard NOISECHECK methodology (Refs. 2 and 3). The roadmap diagram which was provided by Figure 4 is detailed out in Figure A-1 to show the "wiring" of the complete NOISECHECK process as implemented here. The wiring diagram includes all the information and analyses discussed in this Appendix and details of other process steps which were completed without the aid of a computer.

The McChord Operational and Measured Noise Databases have been converted from their original hard-copy records into the comprehensive McChord Sensitivity Study database file (MCSS.DBF, Enable format, see Appendix D). The database file structure is defined to maintain the archival records as well as facilitate the Energy Averaging process. The Enable database definition allows formulae to be incorporated directly into field definitions. All of the analytical steps which are not intrinsic to the database definition are included in the Probability of Consistency Analysis program. The Probability of Consistency Analysis program is embodied by a batch file (POCA.BAT) which executes several preliminary steps and then initiates an Enable master control macro (${9}.MCM). The ${9}.MCM macro contains the optional macro steps required to: (1) Convert the original log data fields to useable AORT codes (AC.MAC, RWT.MAC, and OP_4.MAC); (2) Compute ^SELs and copy data to PoC calculation spreadsheets (TOT.MAC including AVSEL#.RPTs); and (3) Import NOISEMAP *.SPO predictions to calculate the PoC (RFMTSPO.EXE and SPO.MAC, with ${7}.SSM).

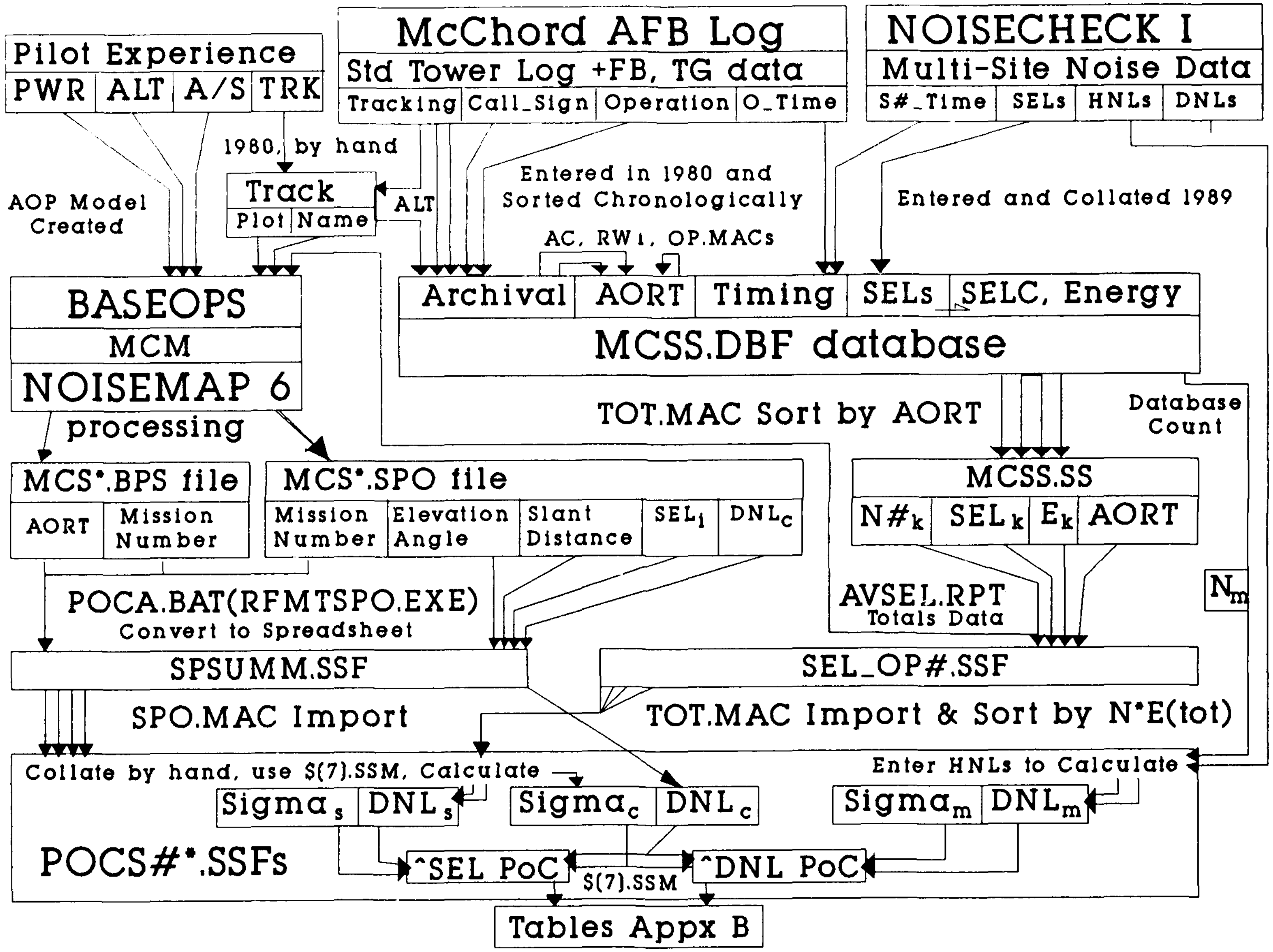


Figure A-1. NOISECHECK Wiring Diagram

The Energy Averaging Analysis of the Operational and Measured Noise Database

The AORT codification process used in the ^SEL analysis preserves the archival McChord measurement study records by defining auxiliary data fields. This process is carried out in several steps using three macros (AC.MAC, RWT.MAC and OP_4.MAC) initiated by the ${9}.MCM macro. First, an aircraft group name (1,2,.. here) is assigned to groups of one or more aircraft to be treated alike. A macro procedure (AC.MAC) is used to assign the aircraft group name to each record in the log file which pertains to any operation of any aircraft in that group. All the original two-letter operation records (TO,FB,TG..) of any aircraft are assigned a one-letter abbreviation, by use of the "O" database field. The logged flight track names originally created by MAN-Acoustics & Noise Inc. (i.e. WF,EF and EN) are simplified to a standard track identifier notation with the letters A-H, as documented in the original NOISEMAP 4 input. This is managed by use of the RWT.MAC macro, which also abbreviates the runways used (34 and 16) with an "N" or "S" respectively. The conversion of logged runway and track to the two-letter runway-track code is dependant on the aircraft type for operations on the inner closed patterns.

The AORT code is then created by concatinating the three fields used above into the "AORT" field containing a four character code. Thus an F-106 doing a touch-and-go northbound on runway 34 to the innermost VFR closed flight track has a "2GND" operational code (and profile name). All codes used in this study are summarized in Table 4, and flight tracks marked with a one-letter identifier on the McChord map, Figures 6 and 8. The four character operational code length was imposed to meet the limiting length of BASEOPS profile names. If several different operations are to be grouped together, a macro procedure (OP_#.MAC) is used to alter the appropriate AORT codes so they are alike. The grouping which is documented (via OP_4.MAC, pg A-17) is that used in the final version of the database analysis.

These macro steps are important preliminaries to the actual computation of ^SEL, since they allow the proper sorting of database records. They must be carried out once prior to any further analysis; some steps may be repeated if the relevant logged data or aircraft operational grouping is changed. It is possible to choose which steps are executed by "commenting out" the unnecessary macro initiation steps within the ${9}.MCM macro. The macro code listings are provided in the last section of this appendix (pg A-9).

The actual Energy Averaging process is carried out in three steps. The first step is accomplished by defining three fields per site to accomplish calculations on individual

measured noise event data. A correction to the SEL for paired operations is facilitated by the database definition of the S#SELC fields, where # represents the site number. The S#SELC field definitions check the COMMENT# fields for the words "PAIR", "PAIR+1" or "PAIR+2", and use the values in the S#SEL fields with the appropriate amount (3, 4.8 or 6 dB, respectively) subtracted automatically. Two more fields (S#SELX and S#SELX2) are defined to calculate the event's noise Energy and Energy Squared. The energy calculation may be suppressed by the user for individual sites and records, by use of the logical fields "Y#".

The option to suppress an event is useful if the user doubts the reliability of the 'operations log-to-measured noise data' correlation. Any operational records which appear to produce unreasonably high noise levels, relative to the (estimated) average for the type of operation, are thereby "commented out" so that the average of the remaining similar events will be calculated. The Energy Averaging process then gives a true average which is usable for further event-by-event screening. In practice, this option was exercised frequently during data entry and screening (Phase I), whenever there was doubt about which of two aircraft operating in the vicinity of the site generated a particular measured noise.

The second step requires another field to be defined to facilitate counting of usable events. It is named N#, and is defined to be 1 if Y# is "TRUE" (T or Y) AND (for the McChord database only!) the time of the event falls in the 0800-2000 hrs measurement period. N# is otherwise 0. In the general case, N# would be 10 for a nighttime event. The MCSS database is sorted (via TOT.MAC) according to the AORT code, such that all operational data of a given type are grouped together for the summation process. Four ENABLE Procedural Language report forms (AVSEL#.RPT) are called from TOT.MAC to total the pertinent fields (N#, S#SELX, S#SELX2). The resulting reports (SEL_OP#.SSF) are converted to ASCII and combined with the boilerplate PoC calculation spreadsheets (POCS#.SSF).

In the third and final step, TOT.MAC sorts the Measured Averaged Total Energy data in descending order. This sorting operation will rank the operational groups in the order of their partial DNLs' contribution to the total measured DNL at a site. Equations are copied to compute the Energy Averaged SEL per Operation (SEL_i) and the Measured [Sample] Standard Deviations of Energy per Operation ($Sigma_{s,i}$) for each operational group. The resulting spreadsheets are automatically saved with a new name, POCS#_.SSF.

The Retrieval of Specific Point Output Data and Computation of the Probability of Consistency

NOISEMAP produces the Specific Point Output (*.SPO) file as its means of documenting the SEL and DNL predictions for individual aircraft operation profiles and all sites (Specific Points) included in the BASEOPS input. This file also contains the Slant Distance and Elevation Angle information needed to compute $Sigma_c$. It is, however, written in an ASCII format designed to be read by a man and is incompatible with the (comma-separated) columnar data format used in spreadsheets. The BASEOPS Profile Summary (*.BPS) file contains profile names which are vital to identifying the aircraft operation. The key to associating a profile name to its corresponding *.SPO SEL prediction is the mission number, a number assigned by BASEOPS to each profile as it is input.

The retrieval of *.SPO information is accomplished by the POCA.BAT batch file which first copies the *.SPO and *.BPS files into the active subdirectory (\ENABLE\MCC for the McChord study) and executes a short BASIC program (RFMTSPO.EXE). Since NOISEMAP generates subdirectory names at random, the user must know the correct subdirectory name to find *.SPO and *.BPS and alter POCA.BAT accordingly prior to using it. The RFMTSPO program was designed to rewrite the necessary data from the *.SPO and *.BPS files to an ASCII file (SPSUMM.SSF) which is compatible with ENABLE spreadsheets. It accesses profile names from the *.BPS file and links them to their respective predicted operational data. POCA.BAT then initiates ENABLE and its master control macro, ${9}.MCM. It includes a macro step (SPO.MAC) used to combine the predicted data from SPSUMM.SSF with the PoC spreadsheets containing measured data (POCS#_.SSF). The SPO.MAC macro then saves the updated spreadsheets to new spreadsheet files named POCS#_?.SSF. The "?" is specified within SPO.MAC to indicate the AOP model number being assessed. Very often during this study, SPO.MAC was the only step taken by the ${9}.MCM macro.

If the AORT classification scheme is used for profile names, the task of correlating the predicted vs measured data by operational group is fairly simple, but still must be done by hand. The correlated data is then copied into the PoC calculation portion of the spreadsheet by initiating a macro using the Alt/F9, 7 keystroke commands. The ${7}.SSM macro moves the necessary correlated AORT codes and noise data into columnar ranges used by the spreadsheet's formulae which calculate the PoC. The summary tables given in Appendix B are then printed (in the spreadsheet format) and the user is prompted to save the result in a new file.

Supplementary Calculations

Two calculations are carried out only once for the purposes of this effort, the DNL adjustment and the Typifying Weather derivation. Nonetheless, it is advantageous to conduct them with the aid of spreadsheets.

The Measured Energy Averaged DNL (DNL_m) is calculated by sequential DNL adjustments applied in columnar ranges in the boilerplate PoC spreadsheets. Each day's measured DNL is calculated, for the McChord study, by tabulating all the hourly noise levels (HNLs) for a given site # in columns of a section of the boilerplate PoC calculation spreadsheet, POCS#.SSF, for each weekday during the 11-29 February 1980 measurement period. Due to limitations placed on the McChord AFB measurement period, all HNLs before 0800 or after 2000 hours are set to 50 dB at Site 1 and 35 dB elsewhere. Sites 7 and 9 HNLs were also set to 35 dB during periods in which no measured noise data were collected. The noise energy for each hour is calculated in an adjacent column. The 24 hourly noise energies are then averaged to give a daily average noise energy, from which the DNL is computed.

The resultant DNL for each day is then copied into a column in the "DNL Adjustments" section of the spreadsheet. The DNL adjustments (pg 20) are carried out in successive columns which contain either the tabulated adjustment data (background noise levels, effective number of operations per day) or the formulae to compute the adjustment. The energy of each day's adjusted DNL is computed in a final column and used to compute both DNL_m and $Sigma_m$. The result of this analysis appears in the PoC calculation section of the spreadsheet, where it is compared to the prediction of any AOP model applicable to the site.

The calculation used to determine the weather typifying the measurement period is carried out in a separate spreadsheet since its results are only used in the BASEOPS General Airfield Data Menu input. The hourly archival weather data are tabulated in two columns (Temperature, Dew Point) for each day during the 11-29 February measurement period. Tetens' formula (Ref. 7), is applied to the Temperature and Dew Point data in a third adjacent column to arrive at Relative Humidity. Again, only those weather measurements during the 0800-2000 hours measurement period are included. An average Temperature and Relative Humidity is computed for each day and tabulated in separate columns. Using the methodology contained in reference 5, one determines the air absorption coefficient by interpolating by hand from the chart given in Figure A-2. This figure gives the air absorption coefficient as a function of Temperature and Relative Humidity for the 1000 Hz 1/3 octave band. The air absorption coefficients are then ranked in ascending order.

Since there are now 15 days used in the determination instead of 12 months, the seventh lowest air absorption coefficient was used.

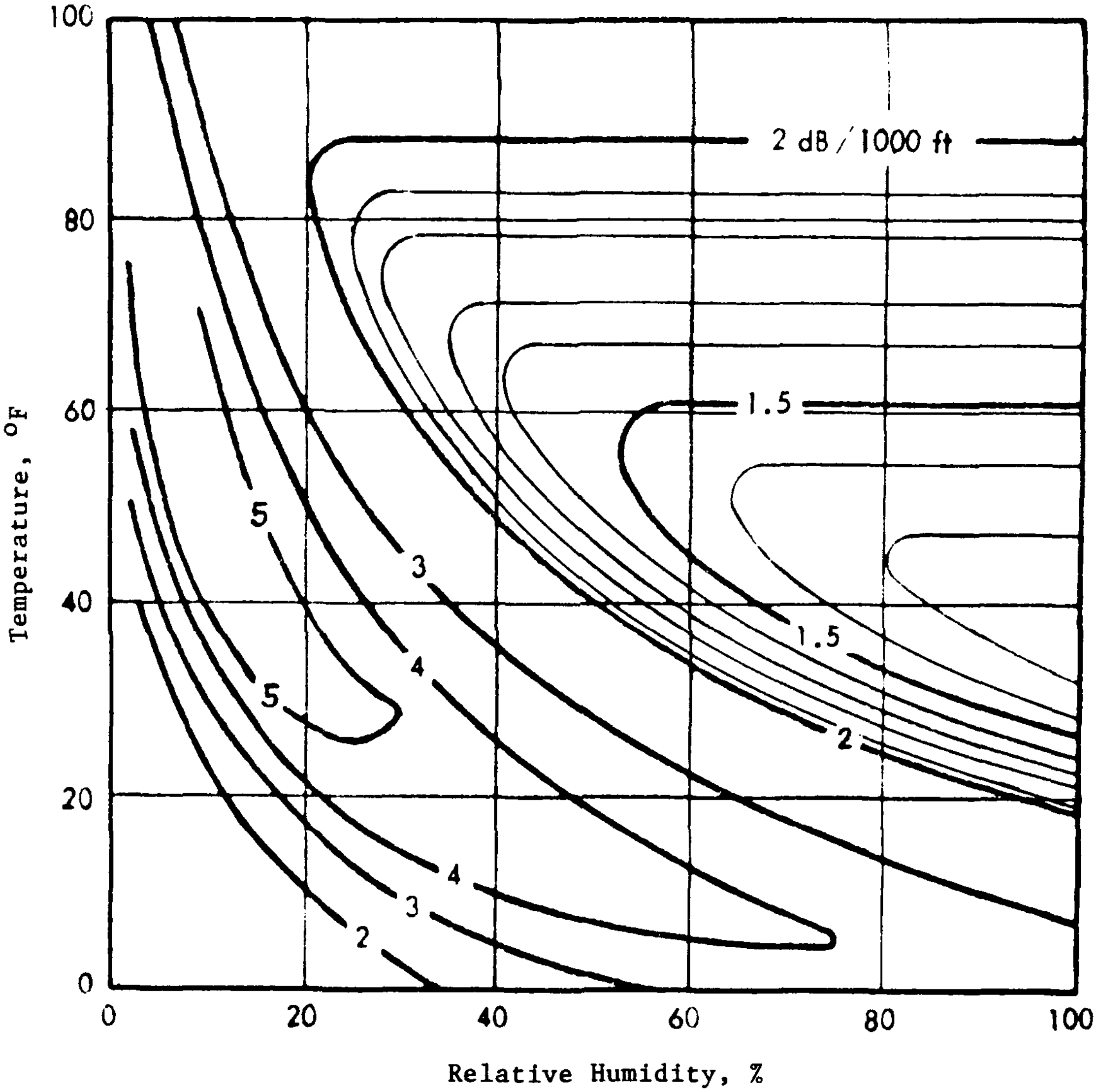


Figure A-2. Contour Plot of SAE ARP 866A Acoustic Absorption Coefficients at 1000 Hz.

The calculation of effective (Perceived Mean Altitude) altitude requires a summary of the relevant altitude data. An ASCII altitude summary is derived from the MCSS database and contains only the appropriate altitude data. This is a simple task using the Enable Find command. This process was conducted so rarely that no further automation was used. The Perceived Mean Altitude calculation is carried out with the aid of a spreadsheet (PMA.SSF) as discussed on page 50. The respective ASCII altitude data files are imported directly into the spreadsheet. The PMA.SSF includes only one equation:

$$PMA_i = \sqrt{\frac{1}{n_i} \cdot \sum_{k=1}^{n_i} \left(\frac{1}{ALT_{k,i}} \right)^2}$$

The Enable Find command has another valuable use when determining $N_F(n)$, the effective number of operations per day, or (see pg 70) the actual number of operations occurring during the operational time frame of malfunctioning noise monitors. The Find command creates a Select Set which can be narrowed down further by applying successive Find commands. The process was carried out by first selecting the daytime operational records (documented in Appendix D). It is then possible to select all operational records which fall in a limited time frame on a given day. The effective number of operations per day was changed using this approach, for 11 Feb at Site 9 and for several days at Site 7.

The measured noise events having no correlated operational records were also sorted out in this way. This was done by selecting records which have "N" in the Y# field and have S#_SEL>0, for each Site # of interest (Sites 8 and 9). The resulting Select Set's site measured noise data and recorded times were printed out.

Program Source Listings

Each of the batch files, programs, macros and report forms used in this study are documented below, with comments included.

```
REM POCA.BAT- Probability of Consistency Assessment Program
REM The batch program which drives all the others in turn.
@echo off
REM These next 6 steps are necessary if SPO.MAC is run via
REM ${9}.MCM.  First two steps delete files which will be
REM created during the process.  Note that pocs?_4.ssf
REM reflects the last model assessment, and can be changed.
del c:\enable\wrl\mcc\spsumm.ssf
del c:\enable\wrl\mcc\pocs?_4.ssf
REM Next copy the NOISEMAP output to filenames used by
REM RFMTSPO.EXE.  The mcs#???? subdirectories and filenames
REM are assigned by NOISEMAP for each model version and must
REM be changed before POCA.BAT is run.
copy d:\nmap\mcs4-996\mcs4-996.spo c:\enable\wrl\mcc\mcc.spo
copy d:\nmap\mcs4-996\mcs42417.bps c:\enable\wrl\mcc\mcc.bps
REM Executes RFMTSPO, from the same directory as data files.
cd enable\wrl\mcc
RFMTSPO.EXE
REM Initiates the Enable ${9}.MCM Master Control Macro
cd\enable
enable (,,,,c:\enable\wrl\mcc),@9
```

```
'  RFMTSPO.BAS -
'  Program to Reformat Specific Point Data in File MCC.SPO
'  and Use the Mission Number to Pull Off the Profile ID
'                 From File MCC.BPS.
'
' The program is written in Microsoft QuickBASIC and appears
' in a form suitable for printing.  Many of the actual lines
' of code extend beyond the right margin.  These lines are
' printed here with a "_" character at the end of the line,
' indicating that the code is continued on the next line.
' The "_" character must be removed and the code restored to
' its original length before compiling.
'
' This program opens files MCC.BPS and MCC.SPO and then
' reads from file MCC.BPS the Profile ID and flight track
' ID for each power sequence number.  The number of flight
' profiles is read from the fourth record in MCC.BPS.  It
' is assumed that the largest power sequence number will
' be less than or equal to the number of flight profiles.
' The MISSION number in the MCC.SPO file must correspond
' to the power sequence number in the MCC.BPS file.  NEXT
' selected flight operations data are read from file
' MCC.SPO and reformatted into a spreadsheet compatible
' format.  The MISSION number in file MCC.SPO is used to
' identify the Profile ID in MCC.BPS.  The program also
' checks the flight track ID from both files to be sure
' that they match; if they don't match a message is
' printed but the data are still reformatted.
'
' This program assumes that the file MCC.SPO contains the
' "/* CASE NAME */" header and the case name record.  It
' only reads flight data and assumes that there will be
' three sets of data blocks (aircraft, mission, etc.) per
' site.  There can be less than six colunms per data block
' but there must be three blocks or the data will be
' incorrect.  The format of the data blocks must be the
' same as the standard NOISEMAP *.SPO file.  Any format
' changes will require program modifications.
'
' The program opens and reads from files MCC.BPS and
' MCC.SPO and writes the reformatted data to file
' SPSUMM.SSF.
'
' To run the program enter the EXE filename (RFMTSPO)
' followed by a RETURN, or use the equivalent batch file
' commands.  The MCC.SPO and MCC.BPS files must be in the
' current directory.
'
CONST FALSE = 0, TRUE = NOT FALSE, NULL = ""
DIM np(9), Profile$(300), track.id$(300), MISSION(20)
DIM eday(20), enight(20), effsel(20), dnl(20)
DIM flight.trk$(20), slant.dist(20), elev.angle(20)
summ$ = "SUMMARY OF AIRCRAFT FLIGHT"
COLOR 14, 4: CLS
```

```
  LOCATE 2, 2: PRINT STRING$(74, "*")
  LOCATE 4, 3: PRINT "Program to Reformat Specific Point_
         Data in the MCC.SPO File and Use the"
  LOCATE 5, 6: PRINT "Mission Number to Pull Off the_
         Profile ID From the MCC.BPS File."
  LOCATE 7, 2: PRINT STRING$(74, "*")
100 LOCATE 11, 5: PRINT SPC(60);
  LOCATE 13, 5: PRINT SPC(60);
  filebps$ = "MCC.BPS": filespo$ = "MCC.SPO"
  LOCATE 11, 5: PRINT "Filenames are: "; filebps$;_
         " and "; filespo$
  LOCATE 13, 5
  ON ERROR GOTO 1900
  OPEN filebps$ FOR INPUT AS 1
  ON ERROR GOTO 0
  FOR i = 1 TO 3
     LINE INPUT #1, a$
  NEXT i
  FOR i = 1 TO 9: INPUT #1, np(i): NEXT i
  IF np(6) < 1 THEN PRINT "No profile data in .BPS file;_
         Terminate Job.": GOTO 2000
  prof.hdr% = FALSE
  WHILE NOT prof.hdr%
     LINE INPUT #1, a$
     IF a$ = "/* FLIGHT PROFILE SECTION */" THEN_
         prof.hdr% = TRUE
  WEND
  FOR i = 1 TO np(6)
     Profile$(i) = NULL
     track.id$(i) = NULL
  NEXT i
  num.profile% = 0
  WHILE num.profile% < np(6)
     num.profile% = num.profile% + 1
     INPUT #1, b$
     INPUT #1, a$: j1 = INSTR(a$, "POWER"): j2 = LEN(a$)
     ii = VAL(MID$(a$, j1 + 5, j2 - j1 - 6))
     IF ii > np(6) THEN
        PRINT "     Profile sequence error; sequence # ";_
         ii; " is > number of profiles."
     ELSE
        j1 = INSTR(LEFT$(b$, 5), " ")
        Profile$(ii) = RTRIM$(LEFT$(b$, j1 - 1))
        j1 = INSTR(LEFT$(a$, 5), " ")
        track.id$(ii) = RTRIM$(LEFT$(a$, j1 - 1))
     END IF
     nc = VAL(RIGHT$(a$, 2))
     IF nc > 0 THEN
        FOR i = 1 TO nc
           LINE INPUT #1, a$
        NEXT i
     END IF
  WEND
  CLOSE 1
```

```
  ON ERROR GOTO 1900
  OPEN filespo$ FOR INPUT AS 2
  filessf$ = "SPSUMM.SSF"
  OPEN filessf$ FOR OUTPUT AS 3
  ON ERROR GOTO 0
  spo.hdr% = FALSE
  WHILE NOT spo.hdr%
     LINE INPUT #2, a$
     IF a$ = "/* CASE NAME */" THEN spo.hdr% = TRUE
  WEND
  LINE INPUT #2, title$: PRINT #3, TAB(5); title$
150 sum.hdr% = FALSE: im = 0
  WHILE NOT sum.hdr% AND NOT EOF(2)
     LINE INPUT #2, a$
     IF LEN(a$) > 26 THEN
        IF INSTR(a$, summ$) > 0 THEN
           sum.hdr% = TRUE: j1 = INSTR(65, a$, "ST")
           IF j1 > 0 THEN
              st$ = MID$(a$, j1, LEN(a$) - j1 + 1)
           ELSE
              st$ = NULL
           END IF
        END IF
     END IF
  WEND
  IF EOF(2) THEN
     CLOSE 2: CLOSE 3
     PRINT "     End of reformat job. Data written to_
           file: "; filessf$
     END
  END IF
  PRINT #3, st$
  PRINT #3, ","; TAB(10); "Profile ID,  EFF SEL,  PTL DNL,_
         Day OPS,  Night OPS,  DIST,  E. ANGLE"
  FOR i.set = 1 TO 3
200  LINE INPUT #2, a$
  IF INSTR(a$, "MISSION") > 0 THEN ms$ = a$ ELSE GOTO 200
210  LINE INPUT #2, a$
  IF INSTR(a$, "FLIGHT TRK") > 0 THEN ft$ = a$ ELSE GOTO 210
213  LINE INPUT #2, a$
  IF INSTR(a$, "SLANT DIST") > 0 THEN sd$ = a$ ELSE GOTO 213
216  LINE INPUT #2, a$
  IF INSTR(a$, "ELEV ANGLE") > 0 THEN ea$ = a$ ELSE GOTO 216
220  LINE INPUT #2, a$
  IF INSTR(a$, "EVENTS DAY") > 0 THEN ed$ = a$ ELSE GOTO 220
  LINE INPUT #2, en$: LINE INPUT #2, es$: LINE INPUT #2, dn$
     i.sel.ct = 7
     FOR i = 14 TO LEN(ms$) STEP 11
        im = im + 1: i.sel.ct = i.sel.ct + 10
        MISSION(im) = VAL(LTRIM$(MID$(ms$, i, 11)))
        flight.trk$(im) = RTRIM$(LTRIM$(MID$(ft$, i, 11)))
        slant.dist(im) = VAL(LTRIM$(MID$(sd$, i, 8)))
        elev.angle(im) = VAL(LTRIM$(MID$(ea$, i, 7)))
        eday(im) = VAL(LTRIM$(MID$(ed$, i, 11)))
```

```
        enight(im) = VAL(LTRIM$(MID$(en$, i, 11)))
        effsel(im) = VAL(LTRIM$(MID$(es$, i.sel.ct, 7)))
        dnl(im) = VAL(LTRIM$(MID$(dn$, i + 2, 8)))
     NEXT i
  NEXT i.set
250 LINE INPUT #2, a$
  IF INSTR(a$, "FLIGHT DNL") > 0 THEN
     fdnl$ = a$
  ELSE
     GOTO 250
  END IF
260 LINE INPUT #2, a$
  IF INSTR(a$, "TOTAL DNL") > 0 THEN
     tdnl$ = a$
  ELSE
     GOTO 260
  END IF
  j1 = INSTR(fdnl$, "DNL") + 3
  j2 = INSTR(tdnl$, "DNL") + 3
  flight.dnl = VAL(LTRIM$(MID$(fdnl$, j1, 11)))
  total.dnl = VAL(LTRIM$(MID$(tdnl$, j2, 11)))
  FOR i = 1 TO im
     j1 = MISSION(i)
     IF flight.trk$(i) <> track.id$(j1) THEN
        PRINT " "
        PRINT "     Track ID's don't agree in .SPO and_
         .BPS files for Mission #"; j1
        PRINT "     Data are written to output file but_
         must be checked!"
     END IF
     PRINT #3, ","; TAB(10);
     PRINT #3, USING "    \  \    "; Profile$(j1);
     PRINT #3, USING ",   ###.##,    ###.## ";_
         effsel(i); dnl(i);
     PRINT #3, USING ",   ##.###,    ##.###,";_
         eday(i); enight(i);
     PRINT #3, USING "     #####"; slant.dist(i);
     PRINT #3, USING ",    ###.##"; elev.angle(i)
  NEXT i
  PRINT #3, "FLIGHT DNL"; ", , ,"; TAB(30);
  PRINT #3, USING "    ###.##"; flight.dnl
  PRINT #3, "TOTAL DNL"; ", , ,"; TAB(30);
  PRINT #3, USING "    ###.##"; total.dnl
  GOTO 150
1900 PRINT "     File MCC.BPS or MCC.SPO were not found in_
         the current directory."
  PRINT "          The job has been terminated."
2000 END
```

```
;; The following macros appear in order in this section.
;; To implement these macros one must first create them
;; using the Enable MCM, MACROS, CREATE commands.  The
;; *.MAC suffix has been added for clarity.
;;
;; ${9}.MCM - Controls the use of all other macros, and
;; must be modified according to the intended purpose.
;; Here it simply imports SPO data for analysis.
;; The first two lines start-up Enable using the "COLOR"
;; profile.  The default profile could also be used.
{3X}~
COLOR~
;;UDI{Do Macro}
;;AC.MAC~
;;
;; Commented out
;;UDI{Do Macro}
;;RWT.MAC~
;;
;; Commented out
;;UDI{Do Macro}
;;OP_4.MAC~
;;
;; Commented out
;;UDI{Do Macro}
;;TOT.MAC~
;;
;; Commented out
USR{Do Macro}
SPO.MAC~
```

```
;; AC.MAC - Generates one-number aircraft codes for all
;; aircraft names in the MCSS database.  Because it uses the
;; Field Replace command, it requires some time to execute.
;; It must be executed once, each time the aircraft grouping
;; is changed.  The "U" code applies to any unrecognizable
;; names in the "AIR_C" field.  Noise events with no
;; corresponding Log event are coded "X".
rmcss{3X}~
AC~
"U"{3X}~
AIR_C="{4X} "{2X}~
"X"{3X}~
AIR_C="C141"{2X}~
"1"{3X}~
AIR_C="F106" OR AIR_C="F101" OR AIR_C="F4{2X} " OR AIR_C
="A6{2X} " OR AIR_C="A4{2X} "{2X}~
"2"{3X}~
{&F3}
AIR_C="T33 " OR AIR_C="T37 " OR AIR_C="T39 "{2X}~
"3"{3X}~
{&F3}
AIR_C="C130"{2X}~
"4"{3X}~
AIR_C="F15 " OR AIR_C="F14 "{2X}~
"5"{3X}~
{&F3}
AIR_C="C135"{2X}~
"6"{3X}~
AIR_C="C9{2X} " OR AIR_C="S3{2X} " OR AIR_C="C5{2X} "{2X}~
"7"{3X}~
AIR_C="P3{2X} " OR AIR_C="L188" OR AIR_C="L382" OR AIR_C
="C118"{2X}~
"8"{3X}~
AIR_C="F5{2X} " OR AIR_C="T38 " OR AIR_C="DC8 " OR AIR_C
="E3{2X} "{2X}~
"9"~
{Esc}
Q
```

```
;; RWT.MAC - Converts all possible combinations of archival
;; runway and track data to the two-letter RWT code, which
;; then included automatically into the AORT code.  This
;; macro also requires some time to execute, and is run only
;; when the track assignments were changed.  Note that the
;; newly created tracks were not edited into the archival
;; database, but merely used by known AORT coded operations.
rmcss{2X}~
RW_P=" 34 " and TRK="WF "~
RWT~
"NA"{3X}~
RW_P=" 34 " and TRK="EF "{2X}~
"NB"{3X}~
RW_P=" 34 " and TRK="EN "{2X}~
"ND"{3X}~
RW_P=" 34 " and TRK="O{2X} "{2X}~
"NE"{3X}~
RW_P=" 34 " and TRK="WC "{2X}~
"NF"{3X}~
RW_P=" 34 " and TRK="EC "{2X}~
"NG"{3X}~
RW_P=" 34 " and TRK="S{2X} "{2X}~
"NH"{3X}~
RW_P=" 16 " and TRK="WF "{2X}~
"SA"{3X}~
RW_P=" 16 " and TRK="EF "{2X}~
"SB"{3X}~
RW_P=" 16 " and TRK="EN "{2X}~
"SD"{3X}~
RW_P=" 16 " and TRK="O{2X} "{2X}~
"SE"{3X}~
RW_P=" 16 " and TRK="WC "{2X}~
"SF"{3X}~
RW_P=" 16 " and TRK="EC "{2X}~
"SG"{3X}~
RW_P=" 16 " and TRK="S{2X} "{2X}~
"SH"{3X}~
RW_P=" 34 " and TRK="EN " and (AC="4" or AC="1"){2X}~
"NC"{3X}~
RW_P=" 16 " and TRK="EN " and (AC="4" or AC="1"){2X}~
"SC"~
{Esc}
q
```

```
;; OP_4.MAC - The final version of aircraft grouping used
;; with the McChord sensitivity study.  It also requires
;; some time to execute and need only be used if revisions
;; in the operational grouping are desired.  Note that
;; OPGRP is used in place of AORT during actual processing.
rmcss~
record~
AORT="8TSH"~
OPGRP~
"8TSH"{3X}~
AORT="1GNA"{2X}~
"1GNA"{3X}~
AORT="2TSH"{2X}~
"2TSH"{3X}~
AORT="2GNA"{2X}~
"2GNA"{3X}~
AORT="7TSH"{2X}~
"7TSH"~
{Esc}
Q
```

```
;; TOT.MAC - Used to derive ^SEL noise data from the MCSS
;; database.  It executes the AVSEL#.RPT report forms to
;; compute ^SEL/op at 4 sites and then revises the POCS#.SSF
;; boilerplate spreadsheets.  Currently requires that four
;; POCS#_.SSFs (and POCS#.SSFs) exist, due to the Replace
;; command (R/QY) used when saving the revised spreadsheet.
;;
;;Sort the MCSS database
SMCSS{3X}~
OPGRP,A{2X}~
{Esc}
;;Generate the ^SEL/op report for SITE 1
9~
AVSEL1.RPT~
DSEL_OP1.SSF{2X}~
{&F2}{Esc}
;;Convert the report to ASCII
QUWRSEL_OP1.SSF~
{F10}
SCAESWUSRSEL_OP1.SSF~
;;Combine the report with PoCs1
;;boilerplate
A/MOOUSRPoCs1~
/CCW1~
ab1~
;;Close window and sort ^SELs
/MO1/QY/WRSC1Dad4{2X}~
Sab4~
{End}
{Down}
{3X}{Right}
~

;;Execute, then copy formulae
;;and erase negligible records
E/WCaf2..ah2~
af4..ah39~
/WCb95..b95~
c98..c133~
/WCab4..ab39~
b98..b133~
/WREab40~
{End}
{Down}
{6X}{Right}
~

;;Save with new name and quit
{Home}
/SCEA~
{13X}{Right}
{Ins}
~

R/QY
;;Generate the ^SEL/op report for SITE 7
```

```
UDI9mcss.ss~
AVSEL7.RPT~
DSEL_OP7.SSF{2X}~
{&F2}{Esc}
;;Convert the report to ASCII
QUWRSEL_OP7.SSF~
{F10}
SCAESWUSRSEL_OP7.SSF~
;;Combine the report with PoCs7
;;boilerplate
A/MOOUSRPoCs7~
/CCW1~
ab1~
;;Close window and sort ^SELs
/MO1/QY/WRSC1Dad4{2X}~
Sab4~
{End}
{Down}
{3X}{Right}
~
;;Execute, then copy formulae
;;and erase negligible records
E/WCaf2..ah2~
af4..ah39~
/WCb95..b95~
c98..c133~
/WCab4..ab39~
b98..b133~
/WREab40~
{End}
{Down}
{6X}{Right}
~
;;Save with new name and quit
{Home}
/SCEA~
{13X}{Right}
{Ins}
~
R/QY
;;Generate the ^SEL/op report for SITE 8
UDI9mcss.ss~
AVSEL8.RPT~
DSEL_OP8.SSF{2X}~
{&F2}{Esc}
;;Convert the report to ASCII
QUWRSEL_OP8.SSF~
{F10}
SCAESWUSRSEL_OP8.SSF~
;;Combine the report with PoCs8
;;boilerplate
A/MOOUSRPoCs8~
/CCW1~
ab1~
```

```
;;Close window and sort ^SELs
/MO1/QY/WRSC1Dad4{2X}~
Sab4~
{End}
{Down}
{3X}{Right}
~

;;Execute, then copy formulae
;;and erase negligible records
E/WCaf2..ah2~
af4..ah39~
/WCb95..b95~
c98..c133~
/WCab4..ab39~
b98..b133~
/WREab40~
{End}
{Down}
{6X}{Right}
~

;;Save with new name and quit
{Home}
/SCEA~
{13X}{Right}
{Ins}
~

R/QY
;;Generate the ^SEL/op report for SITE 9
UDI9mcss.ss~
AVSEL9.RPT~
DSEL_OP9.SSF{2X}~
{&F2}{Esc}
;;Convert the report to ASCII
QUWRSEL_OP9.SSF~
{F10}
SCAESWUSRSEL_OP9.SSF~
;;Combine the report with PoCs9
;;boilerplate
A/MOOUSRPoCs9~
/CCW1~
ab1~
;;Close window and sort ^SELs
/MO1/QY/WRSC1Dad4{2X}~
Sab4~
{End}
{Down}
{3X}{Right}
~

;;Execute, then copy formulae
;;and erase negligible records
E/WCaf2..ah2~
af4..ah39~
/WCb95..b95~
c98..c133~
```

```
/WCab4..ab39~
b98..b133~
/WREab40~
{End}
{Down}
{6X}{Right}
~
;;Save with new name and quit
{Home}
/SCEA~
{13X}{Right}
{Ins}
~
R/QY
```

```
;; SPO.MAC - Used routinely during assessment of AOP models.
;; Combines NM6 SPO data with the appropriate spreadsheets
;; Four POCS?_.SSFs MUST exist, but NO POCS?_4.SSFs!
;; [POCS?_4.SSFs are deleted by the MCCHORD.BAT file]
SPSUMM~
A
;;Combine with ST1 data sheet
/MOOUSRPoCs1_~
/CCW1~
s1~
;;Copy ST1 DNL to calc. area
/WCv22..v22~
h8..h8~
;;Put NM6 ^SELs in position for collating
/WMs4..z89~
s40~
{F2}s1~
/SCEA~
{14X}{Right}
{Ins}
4~
/QY
;;Combine with ST7 data sheet
/MOOUSRPoCs7_~
/CCW1~
s1~
;;Copy ST7 DNL to calc. area
/WCv44..v44~
h8..h8~
;;Put NM6 ^SELs in position for collating
/WMs26..z89~
s40~
/WREs4..z39~
{F2}s1~
/SCEA~
{14X}{Right}
{Ins}
4~
/QY
;;Combine with ST8 data sheet
/MOOUSRPoCs8_~
/CCW1~
s1~
;;Copy ST8 DNL to calc. area
/WCv66..v66~
h8..h8~
;;Put NM6 ^SELs in position for collating
/WMs48..z89~
s40~
/WREs4..z39~
{F2}s1~
/SCEA~
{14X}{Right}
{Ins}
```

```
4~
/QY
;;Combine with ST9 data sheet
/MOOUSRPoCs9_~
/CCW1~
s1~
;;Copy ST9 DNL to calc. area
/WCv88..v88~
h8..h8~
;;Put NM6 ^SELs in position for collating
/WMs70..z89~
s40~
/WREs4..z39~
{F2}s1~
/SCEA~
{14X}{Right}
{Ins}
4~
/QY/QY
```

```
;; ${7}.SSM - An interactive spreadsheet macro which is
;; used after SPO.MAC has imported the Specific Point Output
;; data.  When the predicted and measured ^SEL information
;; have been correlated by hand, use the ALT/F9, 7 commands
;; to execute it.  The relevant columns of data are then
;; copied to the PoC calculation portion of the spreadsheet,
;; and assessment tables (Appx B) are printed.
/WCs1..s1~
a2..a2~
/WCu4..u39~
g98..g133~
/WCv4..v39~
i98..i133~
/WCw4..x39~
q98..r133~
/WCy4..z39~
j98..k133~
/PRa1..i14~
EP/PRa95..i133~
EP{Home}
/S{2X}~
```

```
;; AVSEL1.RPT - A very simple Enable Procedural Language
;; Report form used to total the Number of Operations,
;; Energy and Energy Squared for each aircraft operation
;; group (usually AORT for most operations).  It is executed
;; by the TOT.MAC macro and thereby operates on MCSS.SS,
;; which has been sorted by OPGRP.  It will then generate a
;; spreadsheet compatible ASCII output.  Since all
;; AVSEL#.RPTs are identical except for the Site #, only
;; this (Site 1) code is commented.
.intro
;; Prints header information.
 Summary of Noise Levels by Operation Groups

GRP  #OPS  S1SELX S1SELX2
.body
.reformat off
.break 01 procedure
;; Works on each OPGRP (AORT) in turn
.break on OPGRP
;; Calculates Sum via {S1}
.break summary
[OPGRP],[N1{S1}], [S1SELX{S1}], [S1SELX2{S1}  ]
.break end
;; NO BLANK lines at end of each *.RPT file!


;; AVSEL7.RPT - Separate file, no blank lines at end.
.intro
 Summary of Noise Levels by Operation Groups

GRP  #OPS  S7SELX S7SELX2
.body
.reformat off
.break 01 procedure
.break on OPGRP
.break summary
[OPGRP],[N7{S1}], [S7SELX{S1}], [S7SELX2{S1}  ]
.break end


;; AVSEL8.RPT - Separate file, no blank lines at end.
.intro
 Summary of Noise Levels by Operation Groups

GRP  #OPS  S8SELX S8SELX2
.body
.reformat off
.break 01 procedure
.break on OPGRP
.break summary
[OPGRP],[N8{S1}], [S8SELX{S1}], [S8SELX2{S1}  ]
.break end
```

```
;; AVSEL9.RPT - Separate file, no blank lines at end.
.intro
 Summary of Noise Levels by Operation Groups

GRP  #OPS  S9SELX S9SELX2
.body
.reformat off
.break 01 procedure
.break on OPGRP
.break summary
[OPGRP],[N9{S1}], [S9SELX{S1}], [S9SELX2{S1}  ]
.break end
```

APPENDIX B: PROBABILITY OF CONSISTENCY SUMMARY WORKSHEETS

These tables represent SEL_j predictions due to changes made to operational profiles the AOP models, and SEL_i measurements based on changes to the systematic sorting and analysis of the MCSS database. Some additional calculations were sometimes made in the course of compiling the summary tables used in the text of this report. The equations cited herein refer to Tables 5 and 7. Many of the measured rank (i) ordered noise contributing operations lists have been truncated at i=35 for ease of publication.

Table B-1A. Probability of Consistency Calculations for the MCS1 AOP Model at Site 1, Using Original Profiles and Jan-Mar Weather: 41°F, 46%

DNL Probability of Consistency= 0.83378

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.210	4.0E+07	78.78	1.2E+07	79.26

SEL Probability of Consistency= 0.74320

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.328	2.4E+07	78.54	1.2E+07	79.05

Table B-1B. Noise Contributions Listing for Table B-1A

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	7801	7.67	0.4	-0.4	115.0	74.48	106.6	65.97
i=2	2702	17.93	0.4	-0.4	107.6	70.72	103.5	66.61
i=3	7804	6.80	0.9	-1.2	108.8	67.68	117.7	76.54
i=4	2701	6.80	0.5	-0.5	108.1	66.98	103.5	62.38
i=5	7814	2.33	1.5	-2.2	112.0	66.28	107.4	61.6
i=6	T201	0.40	2.0	-3.7	119.0	65.66	113.6	60.21
i=7	2703	5.27	0.7	-0.8	107.0	64.85	106.8	64.54
i=8	2712	1.60	1.2	-1.8	111.6	64.20	117.9	70.48
i=9	2713	0.60	1.6	-2.6	115.1	63.51	117.9	66.22
i=10	7802	1.73	2.3	-5.0	107.6	60.57	105.0	57.92
i=11	3TNA	2.40	0.5	-0.6	105.7	60.09		
i=12	7808	0.07	0.0	0.0	119.6	58.44		
i=13	7812	0.40	2.4	-5.9	110.0	56.60	107.4	53.93
i=14	2FSH	0.13	0.6	-0.7	113.7	55.57		
i=15	4TNA	4.00	0.5	-0.5	98.4	55.02		
i=16	UTNA	0.40	3.1	N/A	108.2	54.81		
i=17	2LSD	1.00	1.8	-3.0	103.7	54.28		
i=18	2FSG	0.53	3.6	N/A	105.8	53.63		
i=19	7TNA	0.20	2.9	-13.3	109.9	53.47		
i=20	8GNB	0.33	0.9	-1.1	107.5	53.35		
i=21	1LSB	0.07	0.0	0.0	114.3	53.14		
i=22	1LSC	0.13	2.9	-15.6	111.0	52.83		
i=23	7815	0.40	2.4	-6.0	105.7	52.34	107.3	59.3
i=24	2904	4.13	1.6	-2.5	95.6	52.31	101.8	58.48
i=25	2LND	3.00	3.3	N/A	96.8	52.13		
i=26	3GSD	0.47	3.3	N/A	104.2	51.48		
i=27	2715	0.07	0.0	0.0	112.6	51.44	117.9	62.75

Table B-1C. Probability of Consistency Calculations for the MCS1 AOP Model at Site 1, Using Original Profiles and 11-29 Feb Weather: 44°F, 70%

DNL Probability of Consistency= 0.47667

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.712	4.0E+07	78.78	1.6E+07	80.26

SEL Probability of Consistency= 0.30424

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	1.027	2.4E+07	78.54	1.6E+07	80.05

Table B-1D. Noise Contributions Listing for Table B-1C

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	7801	7.67	0.4	-0.4	115.0	74.48	107.8	67.24
i=2	2702	17.93	0.4	-0.4	107.6	70.72	105.0	68.11
i=3	7804	6.80	0.9	-1.2	108.8	67.68	118.7	77.54
i=4	2701	6.80	0.5	-0.5	108.1	66.98	105.0	63.88
i=5	7814	2.33	1.5	-2.2	112.0	66.28	107.8	62.01
i=6	T201	0.40	2.0	-3.7	119.0	65.66	114.8	61.37
i=7	2703	5.27	0.7	-0.8	107.0	64.85	108.2	65.98
i=8	2712	1.60	1.2	-1.8	111.6	64.20	118.6	71.18
i=9	2713	0.60	1.6	-2.6	115.1	63.51	118.6	66.92
i=10	7802	1.73	2.3	-5.0	107.6	60.57	106.3	59.24
i=11	3TNA	2.40	0.5	-0.6	105.7	60.09		
i=12	7808	0.07	0.0	0.0	119.6	58.44		
i=13	7812	0.40	2.4	-5.9	110.0	56.60	107.7	55.5
i=14	2FSH	0.13	0.6	-0.7	113.7	55.57		
i=15	4TNA	4.00	0.5	-0.5	98.4	55.02		
i=16	UTNA	0.40	3.1	N/A	108.2	54.81		
i=17	2LSD	1.00	1.8	-3.0	103.7	54.28		
i=18	2FSG	0.53	3.6	N/A	105.8	53.63		
i=19	7TNA	0.20	2.9	-13.3	109.9	53.47		
i=20	8GNB	0.33	0.9	-1.1	107.5	53.35		
i=21	1LSB	0.07	0.0	0.0	114.3	53.14		
i=22	1LSC	0.13	2.9	-15.6	111.0	52.83		
i=23	7815	0.40	2.4	-6.0	105.7	52.34	107.7	59.7
i=24	2904	4.13	1.6	-2.5	95.6	52.31	102.6	59.28
i=25	2LND	3.00	3.3	N/A	96.8	52.13		
i=26	3GSD	0.47	3.3	N/A	104.2	51.48		
i=27	2715	0.07	0.0	0.0	112.6	51.44	118.6	63.45

Table B-2A. Probability of Consistency Calculations for the MCS2 AOP Model at Site 1, Using New Profiles and Operations Grouping, Without Missed Approaches

DNL Probability of Consistency= 0.35657

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.922	4.0E+07	78.78	3.6E+06	75.84

SEL Probability of Consistency= 0.05362

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	1.930	1.7E+07	78.32	3.6E+06	75.42

Table B-2B. Noise Contributions Listing for Table B-2A

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	2TNA	5.80	0.4	-0.5	115.0	73.22	110.8	68.63
i=2	1GNB	11.40	0.3	-0.3	109.1	70.26	105.2	66.25
i=3	5TNA	1.47	0.7	-0.8	116.1	68.33	114.3	66.5
i=4	1TNA	6.27	0.5	-0.5	108.3	66.86	106.6	64.94
i=5	6TNA	0.27	1.1	-1.5	120.8	65.62	110.8	54.39
i=6	2FND	4.67	1.0	-1.3	107.8	65.13		
i=7	1GNC	3.47	0.6	-0.6	108.6	64.56	108.4	64.26
i=8	2FSD	1.87	1.3	-2.0	111.1	64.45	108.6	60.84
i=9	1FSC	0.60	1.6	-2.6	115.1	63.51	114.0	61.27
i=10	1GSB	0.73	0.6	-0.7	113.5	62.75	114.6	63.41
i=11	5FSD	0.53	2.9	-13.3	113.8	61.66		
i=12	2GND	0.87	1.7	-2.9	111.5	61.46	118.7	67.92
i=13	5FND	1.27	2.5	-6.4	109.2	60.82		
i=14	3TNA	2.67	0.5	-0.6	105.5	60.34	101.0	55.55
i=15	1FSB	0.40	2.6	-7.9	112.1	58.72		
i=16	2TNH	0.13	4.1	N/A	116.7	58.53		
i=17	2GNB	0.20	2.3	-5.5	114.9	58.50		
i=18	1FNB	5.00	0.8	-1.0	100.9	58.49		
i=19	1TNB	1.53	0.9	-1.1	104.5	56.93	106.6	58.96
i=20	2FNB	1.40	2.2	-4.5	104.2	56.28		
i=21	2FSH	0.13	0.6	-0.7	113.7	55.57		
i=22	4TNA	4.00	0.5	-0.5	98.4	55.02		
i=23	UTNA	0.40	3.1	N/A	108.2	54.81		
i=24	2FSB	0.20	3.4	N/A	111.1	54.68	109.6	54.43
i=25	7TNA	0.33	2.4	-5.9	108.7	54.57		
i=26	2FNA	0.40	2.3	-5.5	107.3	53.88		
i=27	2FSG	0.33	3.5	N/A	107.8	53.63		
i=28	8GNB	0.33	0.9	-1.1	107.5	53.35		
i=29	1LSB	0.07	0.0	0.0	114.3	53.14		
i=30	1LSC	0.13	2.9	-15.6	111.0	52.83		
i=31	2LSE	0.27	2.1	-4.4	107.3	52.18	107.7	56.5
i=32	2LSD	0.67	1.7	-2.7	103.3	52.15		
i=33	2LND	2.13	3.3	N/A	98.2	52.13		
i=34	5TSB	0.13	0.0	-0.0	110.2	52.05		
i=35	3GSD	0.93	3.2	N/A	101.4	51.71		

Table B-3A. Probability of Consistency Calculations for the MCS2 AOP Model at Site 1, Using New Profiles and Operations Grouping, With Missed Approaches

DNL Probability of Consistency= 0.35625

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.923	4.0E+07	78.78	3.3E+06	75.84

SEL Probability of Consistency= 0.09005

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	1.695	1.6E+07	78.08	3.3E+06	75.58

Table B-3B. Noise Contributions Listing for Table B-3A

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_S$	DNL_s	SEL_c	DNL_c
i=1	2TNA	5.80	0.4	-0.5	115.0	73.22	110.8	68.63
i=2	1GNB	11.47	0.3	-0.3	109.1	70.26	105.2	66.25
i=3	5TNA	1.47	0.7	-0.8	116.1	68.33	114.3	66.5
i=4	1TNA	6.33	0.5	-0.5	108.2	66.81	106.6	64.94
i=5	6TNA	0.27	1.1	-1.5	120.8	65.62	110.8	54.39
i=6	2FND	4.00	1.1	-1.5	107.8	64.39		
i=7	1GNC	2.67	0.6	-0.8	108.5	63.35	108.4	64.26
i=8	1FSC	0.60	1.7	-2.9	115.0	63.35	114.0	61.27
i=9	2FSD	1.87	1.5	-2.3	109.9	63.20	108.6	60.84
i=10	1GSB	0.73	0.7	-0.8	113.3	62.56	114.6	63.41
i=11	2MND	1.07	1.8	-3.3	109.9	60.73		
i=12	3TNA	2.67	0.5	-0.5	105.1	59.95	101.0	55.55
i=13	1FSB	0.40	2.6	-7.9	112.1	58.72		
i=14	1FNB	5.07	0.8	-1.0	100.9	58.55		
i=15	2TNH	0.13	4.1	N/A	116.7	58.53		
i=16	2GNB	0.20	2.3	-5.5	114.9	58.50		
i=17	1MNC	1.33	1.4	-2.0	106.6	58.49		
i=18	5FSD	0.47	3.1	N/A	111.0	58.32		
i=19	2GND	0.60	2.2	-4.7	109.4	57.78	118.7	67.92
i=20	1TNB	1.53	0.9	-1.1	104.5	56.93	106.6	58.96
i=21	5MND	0.53	3.9	N/A	109.0	56.90		
i=22	2FNB	1.47	2.1	-4.3	104.1	56.40		
i=23	5FND	0.73	2.7	-8.7	106.4	55.63		
i=24	2FSH	0.13	0.6	-0.7	113.7	55.57		
i=25	4TNA	4.00	0.5	-0.5	98.4	54.97		
i=26	UTNA	0.40	3.1	N/A	108.2	54.81		
i=27	7TNA	0.33	2.4	-5.9	108.7	54.57		
i=28	2FNA	0.33	2.4	-5.6	107.8	53.67		
i=29	2FSG	0.33	3.5	N/A	107.8	53.63		
i=30	8GNB	0.33	0.9	-1.1	107.5	53.35		
i=31	1LSB	0.07	0.0	0.0	114.3	53.14		
i=32	1LSC	0.13	2.9	-15.6	111.0	52.83		
i=33	1LSE	0.07	0.0	0.0	112.6	51.44	114.6	61.16
i=35	2FSB	0.20	2.1	-4.1	107.7	51.32	109.6	54.43
i=36	2LSE	0.27	3.0	-17.6	106.0	50.83	107.7	56.5

Table B-3C. Probability of Consistency Calculations for the MCS2 AOP Model at Site 7, Using New Profiles and Improved Operations Grouping

DNL Probability of Consistency= 0.4746

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.715	3.6E+05	57.59	6.7E+04	54.94

SEL Probability of Consistency= 0.61941

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.497	2.3E+05	55.69	6.7E+04	53.98

Table B-3D. Noise Contributions Listing for Table B-3C

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	1GNB	10.60	1.2	-1.7	87.8	48.67	83.8	44.84
i=2	2TSA	0.53	0.9	-1.2	98.0	45.89	96.8	44.11
i=3	1GNC	2.67	1.8	-3.3	90.7	45.58	86.4	42.3
i=4	2FSD	1.87	2.9	-12.0	90.4	43.69	89.6	41.84
i=5	2LND	1.67	2.1	-4.0	90.5	43.29		
i=6	2FND	3.20	1.7	-2.7	87.5	43.16	86.4	42.87
i=7	2FSB	0.20	4.1	N/A	99.4	42.98	100.1	44.98
i=8	1FNB	4.33	1.9	-3.4	85.8	42.82		
i=9	7TSA	0.27	3.0	-19.8	97.9	42.79		
i=10	5TSB	0.13	0.0	-0.0	100.5	42.35	99.5	41.16
i=11	1LNC	1.07	2.4	-5.7	90.2	41.09		
i=12	5LND	0.67	4.2	N/A	92.0	40.84		
i=13	2GND	0.60	2.8	-9.4	92.3	40.65		
i=14	2MND	0.80	2.2	-4.7	90.4	40.02		
i=15	2FSH	0.13	0.9	-1.2	98.1	39.95		
i=16	1LNE	3.13	1.1	-1.4	83.8	39.35	83.6	42.63
i=17	5TSH	0.07	0.0	0.0	100.4	39.24		
i=18	1FSB	0.40	3.9	N/A	92.4	38.99		
i=19	1LNB	1.67	2.3	-5.5	86.1	38.94		
i=20	1TSA	0.53	1.5	-2.4	90.9	38.75	91.3	40.43
i=21	2FNB	1.33	1.1	-1.4	86.5	38.38		
i=22	2LNE	1.33	1.1	-1.4	86.1	37.96	84.3	41.92
i=23	1TSB	0.47	3.1	N/A	90.6	37.86	91.2	38.48
i=24	1TNA	5.73	1.4	-2.0	79.6	37.78		
i=25	1TSH	0.53	1.7	-2.9	89.8	37.64	91.3	39.05
i=26	1FNC	0.80	4.1	N/A	87.7	37.35		
i=27	4TSH	0.47	3.8	N/A	89.9	37.24		
i=28	1MNC	1.07	1.3	-1.9	85.7	36.57		
i=29	1GSB	0.80	1.4	-2.0	86.7	36.30	90.6	39.43
i=30	6LNE	0.40	1.9	-3.4	89.2	35.83	92.8	39.41
i=31	2FNG	0.33	3.6	N/A	89.8	35.68		
i=32	1FNF	1.60	1.9	-3.5	82.9	35.58		
i=33	2TNA	4.60	2.1	-4.4	77.0	34.18	85.2	43.02
i=34	3FND	2.13	3.6	N/A	80.3	34.15		
i=36	1MNF	1.13	2.3	-5.3	82.7	33.84		

Table B-3E. Probability of Consistency Calculations for the MCS2 AOP Model at Site 8, Using New Profiles and Improved Operations Grouping

DNL Probability of Consistency= 0.74253

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.329	1.7E+05	54.78	5.4E+04	55.57

SEL Probability of Consistency= 0.63211

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.479	3.0E+05	52.74	5.4E+04	55.21

Table B-3F. Noise Contributions Listing for Table B-3E

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{SEL}_s$	DNL_s	SEL_c	DNL_c
i=1	1GNC	2.67	3.0	-17.0	90.9	45.76	98.3	54.14
i=2	1GNB	11.47	3.1	N/A	83.0	44.16	73.3	34.36
i=3	2FND	4.00	2.7	-9.0	87.5	44.14	76.7	33.09
i=4	2TSA	0.53	1.2	-1.6	92.9	40.79	90.2	37.43
i=5	X	57.20	1.0	-1.3	72.5	40.70		
i=6	2LNE	2.13	2.3	-5.4	85.9	39.80	75.4	33.03
i=7	2MND	1.07	3.3	N/A	88.6	39.48		
i=8	2FNG	0.33	2.4	-5.5	92.6	38.47		
i=9	2LND	2.13	2.9	-11.8	84.6	38.46		
i=10	5LND	0.73	4.2	N/A	88.5	37.74		
i=11	1FNC	0.93	4.1	N/A	86.6	36.93	93.3	45.3
i=12	2FSB	0.20	4.1	N/A	93.2	36.84	94.7	39.54
i=13	2FSD	1.80	3.0	-19.8	83.6	36.71	82.3	34.49
i=14	5TSB	0.13	0.0	-0.0	94.8	36.65	90.9	32.62
i=15	2FNB	1.47	1.3	-1.8	84.2	36.42		
i=16	1MNC	1.33	3.9	N/A	84.5	36.38		
i=17	2FSH	0.13	0.2	-0.2	94.3	36.15		
i=18	2TNA	5.73	2.3	-5.1	77.9	36.09	80.9	38.67
i=19	2GND	0.60	2.5	-6.5	87.4	35.81		
i=20	7TSA	0.27	2.4	-6.0	90.9	35.74		
i=21	3FND	2.07	3.1	N/A	81.5	35.28		
i=22	UFNB	0.07	0.0	0.0	95.7	34.54		
i=23	1FSB	0.40	4.1	N/A	87.4	34.06		
i=24	1TSA	0.73	1.6	-2.7	84.7	33.98	82.6	31.76
i=25	4TSH	0.53	4.1	N/A	85.9	33.76		
i=26	1GSB	0.73	1.8	-3.1	84.3	33.53		
i=27	4GNC	0.93	3.6	N/A	83.1	33.45	86.2	36.14
i=28	1FSC	0.60	3.3	N/A	84.5	32.92		
i=29	4LNC	2.00	2.8	-11.0	79.3	32.88		
i=30	1LNC	1.27	2.5	-6.7	80.8	32.43		
i=31	1TSB	0.47	3.2	N/A	84.3	31.63		
i=32	2LNB	0.47	1.7	-2.7	84.3	31.55		
i=33	1TSH	0.53	1.9	-3.5	83.7	31.55		
i=34	5TSH	0.07	0.0	0.0	92.5	31.34		
i=35	6LNE	0.40	2.5	-6.4	84.1	30.70		

Table B-3G. Probability of Consistency Calculations for the MCS2 AOP Model at Site 9, Using New Profiles and Improved Operations Grouping

DNL Probability of Consistency= 0.93382

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.083	5.5E+05	60.42	1.9E+05	60.61

SEL Probability of Consistency= 0.45907

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.740	3.2E+05	59.28	1.9E+05	60.50

Table B-3H. Noise Contributions Listing for Table B-3G

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	1GNB	11.27	0.4	-0.5	93.3	54.42	97.4	58.42
i=2	1FNB	4.93	0.5	-0.6	93.0	50.50	82.8	39.72
i=3	1LNE	3.27	0.8	-1.0	91.4	47.12	94.2	53.21
i=4	2LNE	2.07	1.4	-2.0	93.2	46.95	91.6	49.21
i=5	1TNA	5.27	1.2	-1.7	88.5	46.34		
i=6	1LNB	1.87	0.9	-1.2	92.5	45.81	82.8	35.22
i=7	1MNC	1.33	0.7	-0.8	93.4	45.30		
i=8	2MND	1.07	1.7	-2.9	94.2	45.13		
i=9	2FNB	0.87	1.2	-1.7	94.9	44.89	85.1	37.31
i=10	2GNB	0.20	1.9	-3.4	101.1	44.72	93.8	37.4
i=11	2TNA	5.07	3.0	N/A	87.0	44.67	75.6	33.4
i=12	6LNE	0.40	2.2	-4.5	97.9	44.50	101.9	48.51
i=13	1MNF	1.27	0.9	-1.1	91.5	43.17		
i=14	4LNE	4.60	0.7	-0.8	85.5	42.76	83.4	43.24
i=15	4TSH	0.53	4.0	N/A	94.0	41.91		
i=16	2TSA	0.53	2.2	-4.5	93.5	41.39		
i=17	1FNA	0.33	1.0	-1.3	95.4	41.23		
i=18	3MND	1.07	1.9	-3.6	88.4	39.31		
i=19	6FNB	0.13	0.3	-0.3	97.4	39.25		
i=20	3LNE	1.00	1.8	-3.1	87.7	38.31	81.1	36.02
i=21	5TSH	0.07	0.0	0.0	98.6	37.44		
i=22	4FNB	1.27	1.0	-1.2	85.6	37.27		
i=23	9LNE	0.40	1.7	-2.8	90.6	37.23	88.2	36.55
i=24	5TSB	0.13	2.7	-8.4	95.3	37.13		
i=25	4GNB	1.53	1.3	-2.0	84.4	36.87	85.7	38.67
i=26	ULNE	0.60	2.7	-8.5	87.5	35.85		
i=27	1TSB	0.47	3.7	N/A	88.0	35.27		
i=28	5MND	0.53	2.2	-4.9	87.3	35.16		
i=29	1GNC	2.67	3.5	N/A	80.2	35.06		
i=30	2LNB	0.20	1.6	-2.6	91.4	35.03		
i=31	4LNB	0.80	0.9	-1.2	85.2	34.79		
i=32	3FNB	0.60	1.4	-2.2	86.3	34.73		
i=33	2FNA	0.27	3.6	N/A	89.3	34.15		
i=34	1FSB	0.40	2.9	-13.7	87.3	33.94		
i=35	5MSD	0.07	0.0	0.0	94.6	33.44		

Table B-4A. Probability of Consistency Calculations for the MCS3 AOP Model at Site 1, Using Flight Profiles Optimized to Site 1 Measured Noise Data

DNL Probability of Consistency= 0.91736

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.104	4.0E+07	78.78	7.3E+06	78.53

SEL Probability of Consistency= 0.81886

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.229	1.6E+07	78.08	7.3E+06	78.35

Table B-4B. Noise Contributions Listing for Table B-4A

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{SEL}_S$	DNL_S	SEL_c	DNL_c
i=1	2TNA	5.80	0.4	-0.5	115.0	73.22	115.5	73.64
i=2	1GNB	11.47	0.3	-0.3	109.1	70.26	109.2	70.39
i=3	5TNA	1.47	0.7	-0.8	116.1	68.33	115.2	67.44
i=4	1TNA	6.33	0.5	-0.5	108.2	66.81	108.0	66.51
i=5	6TNA	0.27	1.1	-1.5	120.8	65.62	120.3	65.13
i=6	2FND	4.00	1.1	-1.5	107.8	64.39	107.7	64.28
i=7	1GNC	2.67	0.6	-0.8	108.5	63.35	108.4	63.21
i=8	1FSC	0.60	1.7	-2.9	115.0	63.35	114.5	62.83
i=9	2FSD	1.87	1.5	-2.3	109.9	63.20	111.1	64.37
i=10	1GSB	0.73	0.7	-0.8	113.3	62.56	114.2	63.38
i=11	2MND	1.07	1.8	-3.3	109.9	60.73		
i=12	3TNA	2.67	0.5	-0.5	105.1	59.95	104.6	59.37
i=13	1FSB	0.40	2.6	-7.9	112.1	58.72	113.3	59.82
i=14	1FNB	5.07	0.8	-1.0	100.9	58.55	100.9	58.48
i=15	2TNH	0.13	4.1	N/A	116.7	58.53	115.8	57.45
i=16	2GNB	0.20	2.3	-5.5	114.9	58.50	113.3	56.83
i=17	1MNC	1.33	1.4	-2.0	106.6	58.49		
i=18	5FSD	0.47	3.1	N/A	111.0	58.32	119.3	66.58
i=19	2GND	0.60	2.2	-4.7	109.4	57.78	109.8	58.18
i=20	1TNB	1.53	0.9	-1.1	104.5	56.93	105.7	58.14
i=21	5MND	0.53	3.9	N/A	109.0	56.90		
i=22	2FNB	1.47	2.1	-4.3	104.1	56.40		
i=23	5FND	0.73	2.7	-8.7	106.4	55.63		
i=24	2FSH	0.13	0.6	-0.7	113.7	55.57		
i=25	4TNA	4.00	0.5	-0.5	98.4	54.97		
i=26	UTNA	0.40	3.1	N/A	108.2	54.81		
i=27	7TNA	0.33	2.4	-5.9	108.7	54.57		
i=28	2FNA	0.33	2.4	-5.6	107.8	53.67		
i=29	2FSG	0.33	3.5	N/A	107.8	53.63		
i=30	8GNB	0.33	0.9	-1.1	107.5	53.35		
i=31	1LSB	0.07	0.0	0.0	114.3	53.14		
i=32	1LSC	0.13	2.9	-15.6	111.0	52.83		
i=33	1LSE	0.07	0.0	0.0	112.6	51.44		
i=34	1FNA	0.53	2.8	-9.5	103.5	51.37		
i=35	2FSB	0.20	2.1	-4.1	107.7	51.32		

Table B-4C. Probability of Consistency Calculations for the MCS3 AOP Model at Site 7, Using Flight Profiles Optimized to Site 1 Measured Noise Data

DNL Probability of Consistency= 0.47136

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.720	3.6E+05	57.59	6.9E+04	54.91

SEL Probability of Consistency= 0.64137

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.466	2.3E+05	55.69	6.9E+04	54.10

Table B-4D. Noise Contributions Listing for Table B-4C

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	1GNB	10.60	1.2	-1.7	87.8	48.67	83.3	44.44
i=2	2TSA	0.53	0.9	-1.2	98.0	45.89	96.9	44.15
i=3	1GNC	2.67	1.8	-3.3	90.7	45.58	86.4	41.25
i=4	2FSD	1.87	2.9	-12.0	90.4	43.69	90.9	44.2
i=5	2LND	1.67	2.1	-4.0	90.5	43.29		
i=6	2FND	3.20	1.7	-2.7	87.5	43.16	85.5	42.04
i=7	2FSB	0.20	4.1	N/A	99.4	42.98	99.6	43.15
i=8	1FNB	4.33	1.9	-3.4	85.8	42.82	80.5	38.08
i=9	7TSA	0.27	3.0	-19.8	97.9	42.79		
i=10	5TSB	0.13	0.0	-0.0	100.5	42.35	100.5	42.16
i=11	1LNC	1.07	2.4	-5.7	90.2	41.09		
i=12	5LND	0.67	4.2	N/A	92.0	40.84		
i=13	2GND	0.60	2.8	-9.4	92.3	40.65	88.7	37
i=14	2MND	0.80	2.2	-4.7	90.4	40.02		
i=15	2FSH	0.13	0.9	-1.2	98.1	39.95		
i=16	1LNE	3.13	1.1	-1.4	83.8	39.35	83.6	42.63
i=17	5TSH	0.07	0.0	0.0	100.4	39.24		
i=18	1FSB	0.40	3.9	N/A	92.4	38.99		
i=19	1LNB	1.67	2.3	-5.5	86.1	38.94		
i=20	1TSA	0.53	1.5	-2.4	90.9	38.75	91.0	40.21
i=21	2FNB	1.33	1.1	-1.4	86.5	38.38		
i=22	2LNE	1.33	1.1	-1.4	86.1	37.96	84.3	41.92
i=23	1TSB	0.47	3.1	N/A	90.6	37.86	91.0	38.3
i=24	1TNA	5.73	1.4	-2.0	79.6	37.78		
i=25	1TSH	0.53	1.7	-2.9	89.8	37.64	91.0	38.83
i=26	1FNC	0.80	4.1	N/A	87.7	37.35		
i=27	4TSH	0.47	3.8	N/A	89.9	37.24		
i=28	1MNC	1.07	1.3	-1.9	85.7	36.57		
i=29	1GSB	0.80	1.4	-2.0	86.7	36.30	90.6	39.8
i=30	6LNE	0.40	1.9	-3.4	89.2	35.83	92.8	39.41
i=31	2FNG	0.33	3.6	N/A	89.8	35.68		
i=32	1FNF	1.60	1.9	-3.5	82.9	35.58		
i=33	2TNA	4.60	2.1	-4.4	77.0	34.18	85.3	43.47
i=34	3FND	2.13	3.6	N/A	80.3	34.15		
i=35	X	45.27	0.9	-1.1	66.8	33.96		

Table B-4E. Probability of Consistency Calculations for the MCS3 AOP Model at Site 8, Using Flight Profiles Optimized to Site 1 Measured Noise Data

DNL Probability of Consistency= 0.98201

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.023	1.7E+05	54.78	5.7E+04	54.84

SEL Probability of Consistency= 0.76458

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.299	3.0E+05	52.74	5.7E+04	54.45

Table B-4F. Noise Contributions Listing for Table B-4E

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	1GNC	2.67	3.0	-17.0	90.9	45.76	98.3	53.09
i=2	1GNB	11.47	3.1	N/A	83.0	44.16	73.0	34.16
i=3	2FND	4.00	2.7	-9.0	87.5	44.14	75.6	32.15
i=4	2TSA	0.53	1.2	-1.6	92.9	40.79	90.2	37.44
i=5	X	57.20	1.0	-1.3	72.5	40.70		
i=6	2LNE	2.13	2.3	-5.4	85.9	39.80	75.4	33.03
i=7	2MND	1.07	3.3	N/A	88.6	39.48		
i=8	2FNG	0.33	2.4	-5.5	92.6	38.47		
i=9	2LND	2.13	2.9	-11.8	84.6	38.46		
i=10	5LND	0.73	4.2	N/A	88.5	37.74		
i=11	1FNC	0.93	4.1	N/A	86.6	36.93	93.4	45.4
i=12	2FSB	0.20	4.1	N/A	93.2	36.84	94.2	37.72
i=13	2FSD	1.80	3.0	-19.8	83.6	36.71	83.7	36.99
i=14	5TSB	0.13	0.0	-0.0	94.8	36.65	91.9	33.54
i=15	2FNB	1.47	1.3	-1.8	84.2	36.42		
i=16	1MNC	1.33	3.9	N/A	84.5	36.38		
i=17	2FSH	0.13	0.2	-0.2	94.3	36.15		
i=18	2TNA	5.73	2.3	-5.1	77.9	36.09	80.9	39.08
i=19	2GND	0.60	2.5	-6.5	87.4	35.81		
i=20	7TSA	0.27	2.4	-6.0	90.9	35.74		
i=21	3FND	2.07	3.1	N/A	81.5	35.28		
i=22	UFNB	0.07	0.0	0.0	95.7	34.54		
i=23	1FSB	0.40	4.1	N/A	87.4	34.06		
i=24	1TSA	0.73	1.6	-2.7	84.7	33.98	82.5	31.67
i=25	4TSH	0.53	4.1	N/A	85.9	33.76		
i=26	1GSB	0.73	1.8	-3.1	84.3	33.53	81.9	31.05
i=27	4GNC	0.93	3.6	N/A	83.1	33.45	86.2	36.14
i=28	1FSC	0.60	3.3	N/A	84.5	32.92		
i=29	4LNC	2.00	2.8	-11.0	79.3	32.88		
i=30	1LNC	1.27	2.5	-6.7	80.8	32.43		
i=31	1TSB	0.47	3.2	N/A	84.3	31.63		
i=32	2LNB	0.47	1.7	-2.7	84.3	31.55		
i=33	1TSH	0.53	1.9	-3.5	83.7	31.55		
i=34	5TSH	0.07	0.0	0.0	92.5	31.34		
i=35	6LNE	0.40	2.5	-6.4	84.1	30.70		

Table B-4G. Probability of Consistency Calculations for the MCS3 AOP Model at Site 9, Using Flight Profiles Optimized to Site 1 Measured Noise Data

DNL Probability of Consistency= 0.91119

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.112	5.5E+05	60.42	1.7E+05	60.67

SEL Probability of Consistency= 0.42672

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.795	3.2E+05	59.28	1.7E+05	60.55

Table B-4H. Noise Contributions Listing for Table B-4G

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{SEL}_S$	DNL_S	SEL_c	DNL_c
i=1	1GNB	11.27	0.4	-0.5	93.3	54.42	97.0	58.15
i=2	1FNB	4.93	0.5	-0.6	93.0	50.50	90.6	48.22
i=3	1LNE	3.27	0.8	-1.0	91.4	47.12	94.2	53.21
i=4	2LNE	2.07	1.4	-2.0	93.2	46.95	91.6	49.22
i=5	1TNA	5.27	1.2	-1.7	88.5	46.34		
i=6	1LNB	1.87	0.9	-1.2	92.5	45.81		
i=7	1MNC	1.33	0.7	-0.8	93.4	45.30		
i=8	2MND	1.07	1.7	-2.9	94.2	45.13		
i=9	2FNB	0.87	1.2	-1.7	94.9	44.89	85.1	37.31
i=10	2GNB	0.20	1.9	-3.4	101.1	44.72	93.9	37.42
i=11	2TNA	5.07	3.0	N/A	87.0	44.67	75.8	33.94
i=12	6LNE	0.40	2.2	-4.5	97.9	44.50	101.9	48.51
i=13	1MNF	1.27	0.9	-1.1	91.5	43.17		
i=14	4LNE	4.60	0.7	-0.8	85.5	42.76	83.4	43.24
i=15	4TSH	0.53	4.0	N/A	94.0	41.91		
i=16	2TSA	0.53	2.2	-4.5	93.5	41.39	85.5	32.8
i=17	1FNA	0.33	1.0	-1.3	95.4	41.23		
i=18	3MND	1.07	1.9	-3.6	88.4	39.31		
i=19	6FNB	0.13	0.3	-0.3	97.4	39.25		
i=20	3LNE	1.00	1.8	-3.1	87.7	38.31	81.1	36.02
i=21	5TSH	0.07	0.0	0.0	98.6	37.44		
i=22	4FNB	1.27	1.0	-1.2	85.6	37.27		
i=23	9LNE	0.40	1.7	-2.8	90.6	37.23	88.2	36.55
i=24	5TSB	0.13	2.7	-8.4	95.3	37.13		
i=25	4GNB	1.53	1.3	-2.0	84.4	36.87	85.7	38.67
i=26	ULNE	0.60	2.7	-8.5	87.5	35.85		
i=27	1TSB	0.47	3.7	N/A	88.0	35.27		
i=28	5MND	0.53	2.2	-4.9	87.3	35.16		
i=29	1GNC	2.67	3.5	N/A	80.2	35.06		
i=30	2LNB	0.20	1.6	-2.6	91.4	35.03		
i=31	4LNB	0.80	0.9	-1.2	85.2	34.79		
i=32	3FNB	0.60	1.4	-2.2	86.3	34.73		
i=33	2FNA	0.27	3.6	N/A	89.3	34.15		
i=34	1FSB	0.40	2.9	-13.7	87.3	33.94		
i=35	5MSD	0.07	0.0	0.0	94.6	33.44		

Table B-5A. Probability of Consistency Calculations for the MCS4 AOP Model at Site 1, Including Flight Track Revisions and Re-analysis of ^SELs

DNL Probability of Consistency= 0.91408

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.108	4.0E+07	78.78	7.1E+06	78.52

SEL Probability of Consistency= 0.86539

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty\t:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.169	1.6E+07	77.99	7.1E+06	78.18

Table B-5B. Noise Contributions Listing for Table B-5A

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	2TNA	5.60	0.5	-0.5	115.0	73.05	115.5	73.51
i=2	1GNB	11.20	0.3	-0.3	109.1	70.15	109.2	70.39
i=3	5TNA	1.47	0.7	-0.8	116.1	68.33	115.8	68.02
i=4	6TNA	0.27	1.1	-1.5	120.8	65.62	120.3	65.13
i=5	1TNA	4.47	0.6	-0.7	107.7	64.83	108.0	65.0
i=6	2FND	4.33	1.1	-1.5	107.4	64.39	107.7	64.28
i=7	1GNC	2.87	0.6	-0.7	108.7	63.82	108.4	63.21
i=8	1FSC	0.60	1.7	-2.9	115.0	63.35	114.5	62.83
i=9	2FSD	1.87	1.5	-2.3	109.9	63.20	111.1	64.37
i=10	1GSB	0.73	0.7	-0.8	113.3	62.56	114.2	63.38
i=11	1GNA	1.87	0.6	-0.7	109.1	62.43	108.0	61.23
i=12	2MND	1.07	1.8	-3.3	109.9	60.73	111.2	62.08
i=13	3TNA	2.67	0.5	-0.5	105.1	59.95	104.6	59.37
i=14	2GNA	0.20	1.7	-2.9	115.6	59.19	115.5	59.04
i=15	1FSB	0.40	2.6	-7.9	112.1	58.72	113.3	59.82
i=16	1MNC	1.40	1.4	-2.0	106.5	58.58		
i=17	1FNB	5.07	0.8	-1.0	100.9	58.55	100.9	58.49
i=18	2TNH	0.13	4.1	N/A	116.7	58.53	118.4	60.1
i=19	2GNB	0.20	2.3	-5.5	114.9	58.50	115.5	59.02
i=20	5FSD	0.47	3.1	N/A	111.0	58.32		
i=21	2GND	0.60	2.2	-4.7	109.4	57.78		
i=22	1TNB	1.53	0.9	-1.1	104.5	56.93		
i=23	5MND	0.53	3.9	N/A	109.0	56.90		
i=24	2FNB	1.47	2.1	-4.3	104.1	56.40		
i=25	5FND	0.73	2.7	-8.7	106.4	55.63		
i=26	2FSH	0.13	0.6	-0.7	113.7	55.57		
i=27	4TNA	4.00	0.5	-0.5	98.4	54.97		
i=28	UTNA	0.40	3.1	N/A	108.2	54.81		
i=29	7TNA	0.33	2.4	-5.9	108.7	54.57		
i=30	2FNA	0.33	2.4	-5.6	107.8	53.67		
i=31	2FSG	0.33	3.5	N/A	107.8	53.63		
i=32	8GNB	0.33	0.9	-1.1	107.5	53.35		
i=33	1LSB	0.07	0.0	0.0	114.3	53.14		
i=34	1LSC	0.13	2.9	-15.6	111.0	52.83		
i=35	1LSE	0.07	0.0	0.0	112.6	51.44		

Table B-5C. Probability of Consistency Calculations for the MCS4 AOP Model at Site 7, Including Flight Track Revisions and Re-analysis of ^SELs

DNL Probability of Consistency= 0.97998

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.025	3.6E+05	57.59	1.0E+05	57.52

SEL Probability of Consistency= 0.8056

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.246	2.1E+05	55.59	1.0E+05	56.24

Table B-5D. Noise Contributions Listing for Table B-5C

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	1GNB	10.33	1.2	-1.6	87.1	47.85	87.1	48.25
i=2	1GNC	2.87	1.7	-2.8	91.7	46.89	92.3	47.07
i=3	2FND	3.53	1.6	-2.5	87.8	43.88	88.6	45.14
i=4	2TSA	0.33	0.9	-1.2	97.9	43.78	98.0	43.71
i=5	2FSD	1.87	2.9	-12.0	90.4	43.69	90.9	44.2
i=6	2LND	1.80	2.0	-3.8	90.3	43.44	90.4	44.19
i=7	2FSB	0.20	4.1	N/A	99.4	42.98	99.6	43.15
i=8	1FNB	4.33	1.9	-3.4	85.8	42.82	86.0	43.56
i=9	5TSB	0.13	0.0	-0.0	100.5	42.35	100.5	42.15
i=10	2TSH	0.20	1.9	-3.6	98.1	41.74	98.0	41.6
i=11	7TSA	0.13	3.6	N/A	99.8	41.60		
i=12	1LNC	1.07	2.4	-5.7	90.2	41.09	93.3	44.89
i=13	5LND	0.67	4.2	N/A	92.0	40.84	93.3	42.53
i=14	2GND	0.60	2.8	-9.4	92.3	40.65	94.5	42.88
i=15	2MND	0.80	2.2	-4.7	90.4	40.02	91.8	42.66
i=16	2FSH	0.13	0.9	-1.2	98.1	39.95		
i=17	1LNE	3.13	1.1	-1.4	83.8	39.35		
i=18	5TSH	0.07	0.0	0.0	100.4	39.24	100.4	39.39
i=19	1FSB	0.40	3.9	N/A	92.4	38.99		
i=20	1LNB	1.67	2.3	-5.5	86.1	38.94		
i=21	1TSA	0.53	1.5	-2.4	90.9	38.75	91.0	40.21
i=22	2FNB	1.33	1.1	-1.4	86.5	38.38		
i=23	2LNE	1.33	1.1	-1.4	86.1	37.96	87.7	41.49
i=24	1TSB	0.47	3.1	N/A	90.6	37.86		
i=25	1TSH	0.53	1.7	-2.9	89.8	37.64		
i=26	1GNA	1.80	1.1	-1.4	84.5	37.63		
i=27	1FNC	0.80	4.1	N/A	87.7	37.35		
i=28	4TSH	0.47	3.8	N/A	89.9	37.24		
i=29	1MNC	1.13	1.3	-1.9	85.5	36.64		
i=30	7TSH	0.13	3.7	N/A	94.7	36.57		
i=31	1GSB	0.80	1.4	-2.0	86.7	36.30		
i=32	6LNE	0.40	1.9	-3.4	89.2	35.83		
i=33	1FNF	1.53	1.9	-3.6	83.1	35.52		
i=34	3FND	2.13	3.6	N/A	80.3	34.15		
i=35	1MNF	1.20	2.3	-5.1	82.5	33.93		

Table B-5E. Probability of Consistency Calculations for the MCS4 AOP Model at Site 8, Including Flight Track Revisions and Re-analysis of ^SELs

DNL Probability of Consistency= 0.51411

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.652	1.7E+05	54.78	3.0E+04	52.68

SEL Probability of Consistency= 0.97995

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.025	2.0E+05	52.14	3.0E+04	52.00

Table B-5F. Noise Contributions Listing for Table B-5E

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	1GNC	2.87	2.7	-9.1	91.4	46.54	91.8	46.6
i=2	2FND	4.33	2.3	-5.4	88.2	45.19	88.6	45.19
i=3	2LNE	2.13	2.3	-5.4	85.9	39.80	85.6	39.46
i=4	2MND	1.07	3.3	N/A	88.6	39.48	85.9	36.69
i=5	2TSA	0.33	1.4	-2.1	93.6	39.44	91.0	36.78
i=6	2LND	2.27	2.8	-9.8	84.5	38.64	84.7	38.57
i=7	5LND	0.73	4.2	N/A	88.5	37.74	87.8	36.99
i=8	1FNC	0.93	4.1	N/A	86.6	36.93	86.9	37.09
i=9	2FSB	0.20	4.1	N/A	93.2	36.84	94.2	37.72
i=10	2FSD	1.80	3.0	-19.8	83.6	36.71	83.7	36.99
i=11	5TSB	0.13	0.0	-0.0	94.8	36.65		
i=12	2FNB	1.47	1.3	-1.8	84.2	36.42		
i=13	1MNC	1.40	4.0	N/A	84.2	36.23	85.5	37.24
i=14	2FSH	0.13	0.2	-0.2	94.3	36.15		
i=15	2GND	0.60	2.5	-6.5	87.4	35.81	88.9	37.21
i=16	3FND	2.07	3.1	N/A	81.5	35.28		
i=17	2TSH	0.20	0.9	-1.1	91.4	35.05	91.2	34.76
i=18	UFNB	0.07	0.0	0.0	95.7	34.54		
i=19	2TNA	5.53	2.8	-11.2	76.1	34.14	79.0	37.07
i=20	4GNC	0.93	3.3	N/A	83.8	34.10	86.2	36.14
i=21	1FSB	0.40	4.1	N/A	87.4	34.06		
i=22	7TSA	0.13	3.1	N/A	92.2	34.03		
i=23	1TSA	0.73	1.6	-2.7	84.7	33.98		
i=24	4TSH	0.53	4.1	N/A	85.9	33.76		
i=25	1GSB	0.73	1.8	-3.1	84.3	33.53		
i=26	1FSC	0.60	3.3	N/A	84.5	32.92		
i=27	4LNC	2.00	2.8	-11.0	79.3	32.88	82.9	36.46
i=28	1GNB	11.20	1.5	-2.4	71.5	32.63	76.6	37.75
i=29	1LNC	1.27	2.5	-6.7	80.8	32.43		
i=30	1TSB	0.47	3.2	N/A	84.3	31.63		
i=31	2LNB	0.47	1.7	-2.7	84.3	31.55		
i=32	1TSH	0.53	1.9	-3.5	83.7	31.55		
i=33	5TSH	0.07	0.0	0.0	92.5	31.34		
i=34	7TSH	0.13	3.7	N/A	89.0	30.84		
i=35	6LNE	0.40	2.5	-6.4	84.1	30.70		

Table B-5G. Probability of Consistency Calculations for the MCS4 AOP Model at Site 9, Including Flight Track Revisions and Re-analysis of ^SELs

DNL Probability of Consistency= 0.80712

Eqn:	1.9	1.5	1.4	1.7	
Qty:	Z	$Sigma_m$	DNL_m	$Sigma_c$	DNL_c
Value:	0.244	5.5E+05	60.42	1.1E+05	59.85

SEL Probability of Consistency= 0.80204

Eqn:	2.8	2.5	2.4	1.7	2.7
Qty:	Z	$Sigma_s$	DNL_s	$Sigma_c$	DNL_{ct}
Value:	0.251	2.6E+05	59.26	1.1E+05	59.61

Table B-5H. Noise Contributions Listing for Table B-5G

Eqn:		2.1	2.3		2.1	2.4		
Qty:	AORT	N_i	+ 90%ci	-	$\hat{}SEL_s$	DNL_s	SEL_c	DNL_c
i=1	1GNB	11.00	0.4	-0.5	93.4	54.42	94.2	55.37
i=2	1FNB	4.93	0.5	-0.6	93.0	50.50	92.6	50.18
i=3	1LNE	3.27	0.8	-1.0	91.4	47.12	93.2	48.9
i=4	2LNE	2.07	1.4	-2.0	93.2	46.95	90.8	44.65
i=5	1GNA	1.67	0.7	-0.8	93.5	46.34	92.7	45.98
i=6	1LNB	1.87	0.9	-1.2	92.5	45.81	94.6	47.86
i=7	1MNC	1.40	0.8	-0.9	93.2	45.30	92.9	44.69
i=8	2MND	1.07	1.7	-2.9	94.2	45.13	92.5	43.32
i=9	2FNB	0.87	1.2	-1.7	94.9	44.89	91.5	43.7
i=10	2GNB	0.20	1.9	-3.4	101.1	44.72	99.6	43.16
i=11	2GNA	0.20	1.9	-3.5	100.9	44.53	99.7	43.29
i=12	6LNE	0.40	2.2	-4.5	97.9	44.50	102.3	48.84
i=13	1MNF	1.33	0.9	-1.1	91.8	43.61	90.6	42.15
i=14	4LNE	4.60	0.7	-0.8	85.5	42.76	83.4	43.24
i=15	4TSH	0.53	4.0	N/A	94.0	41.91		
i=16	1FNA	0.33	1.0	-1.3	95.4	41.23	92.5	40.3
i=17	3MND	1.07	1.9	-3.6	88.4	39.31		
i=18	6FNB	0.13	0.3	-0.3	97.4	39.25		
i=19	2TSH	0.20	3.1	N/A	95.0	38.66	93.0	36.54
i=20	3LNE	1.00	1.8	-3.1	87.7	38.31		
i=21	2TSA	0.33	2.6	-7.9	92.3	38.08		
i=22	5TSH	0.07	0.0	0.0	98.6	37.44		
i=23	4FNB	1.27	1.0	-1.2	85.6	37.27		
i=24	9LNE	0.40	1.7	-2.8	90.6	37.23	88.2	36.55
i=25	5TSB	0.13	2.7	-8.4	95.3	37.13		
i=26	4GNB	1.53	1.3	-2.0	84.4	36.87	85.7	38.67
i=27	ULNE	0.60	2.7	-8.5	87.5	35.85		
i=28	1TSB	0.47	3.7	N/A	88.0	35.27		
i=29	5MND	0.53	2.2	-4.9	87.3	35.16		
i=30	2LNB	0.20	1.6	-2.6	91.4	35.03		
i=31	4LNB	0.80	0.9	-1.2	85.2	34.79		
i=32	3FNB	0.60	1.4	-2.2	86.3	34.73		
i=33	2FNA	0.27	3.6	N/A	89.3	34.15		
i=34	1FSB	0.40	2.9	-13.7	87.3	33.94		
i=35	1MNG	0.07	0.0	0.0	94.5	33.34		

APPENDIX C: FINAL OPERATIONAL PROFILES MODEL SUMMARY

```
USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                       OPERATIONS SUMMARY                               USAF
USAF                                                                        USAF
USAF                              FOR                                       USAF
USAF                                                                        USAF
USAF                          MCCHORD AFB                                   USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF  DESCRIPTION:                                                          USAF
USAF        This is the final version of a series of AOP models             USAF
USAF        developed for the McChord Sensitivity Study.  Various           USAF
USAF        revisions have been made to the original aircraft flight        USAF
USAF        track and profile data as discussed in the Technical Report.    USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF     FILE NAME   :  MCS4                                                USAF
USAF                                                                        USAF
USAF     DATE        :  12-12-90                                            USAF
USAF                                                                        USAF
USAF     PREPARED BY:  W.R. Lundberg                                        USAF
USAF                                                                        USAF
USAF                   AAMRL/BBE                                            USAF
USAF                                                                        USAF
USAF                   Wright-Patterson AFB, OHIO   45433                   USAF
USAF                                                                        USAF
USAF                   AV 785-3664                                          USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF                                                                        USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     USAF
USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF
```

```
USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00    USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00    USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00    USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                         OPERATIONS SUMMARY                            USAF
USAF                                                                       USAF
USAF                                FOR                                    USAF
USAF                                                                       USAF
USAF                            MCCHORD AFB                                USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF  DESCRIPTION:                                                         USAF
USAF        This is the final version of a series of AOP models            USAF
USAF        developed for the McChord Sensitivity Study.  Various          USAF
USAF        revisions have been made to the original aircraft flight       USAF
USAF        track and profile data as discussed in the Technical Report.   USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF     FILE NAME   :  MCS4                                               USAF
USAF                                                                       USAF
USAF     DATE        :  12-12-90                                           USAF
USAF                                                                       USAF
USAF     PREPARED BY:   W.R. Lundberg                                      USAF
USAF                                                                       USAF
USAF                    AAMRL/BBE                                          USAF
USAF                                                                       USAF
USAF                    Wright-Patterson AFB, OHIO   45433                 USAF
USAF                                                                       USAF
USAF                    AV 785-3664                                        USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF                                                                       USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00    USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00    USAF
USAF    BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00     BASEOPS 3.00    USAF
USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF USAF
```

APPROVING OFFICIAL

____ DATE ____________

REVIEW

____ DATE ____________

____ DATE ____________

____ DATE ____________

____ DATE ____________

```
==============================================================================
                             AIRFIELD INFORMATION
==============================================================================
  Magnetic Declination : 21.5 degrees to EAST
  Field Elevation      : 322 ft.

==============================================================================
                               SPECIFIC POINTS
==============================================================================

    Specific point : ST1
        Entered at :  47 Degrees  9  Minutes 11.1 Seconds North Latitude
                     122 Degrees 28  Minutes 30.6 Seconds West Longitude
                     (X = 99983 , Y = 211597 )

    Specific point : ST7
        Entered at :  47 Degrees  5  Minutes 18.1 Seconds North Latitude
                     122 Degrees 27  Minutes 39.8 Seconds West Longitude
                     (X = 103483 , Y = 188002 )

    Specific point : ST8
        Entered at :  47 Degrees  4  Minutes 48.5 Seconds North Latitude
                     122 Degrees 26  Minutes 41.7 Seconds West Longitude
                     (X = 107487 , Y = 185005 )

    Specific point : ST9
        Entered at :  47 Degrees  1  Minutes 21.1 Seconds North Latitude
                     122 Degrees 28  Minutes 30.6 Seconds West Longitude
                     (X = 99983 , Y = 164002 )

==============================================================================
                              NAVIGATIONAL AIDS
==============================================================================
                      *** NO NAVIGATIONAL AIDS ENTERED ***

==============================================================================
                                   RUNWAYS
==============================================================================
            Runway : 16
            Length : 10100 ft.    Glide Slope : 2.5 Degrees
     Displacements : TAKEOFF - 200 ft.
                     LANDING - 200 ft.
             Start :  47 Degrees  8  Minutes 56.3 Seconds North Latitude
                     122 Degrees 28  Minutes 31.5 Seconds West Longitude
                     (X = 99923 , Y = 210100 )
               End :  47 Degrees  7  Minutes 16.6 Seconds North Latitude
                     122 Degrees 28  Minutes 30.5 Seconds West Longitude
                     (X = 99992 , Y = 200000 )
```

```
*****************************************************************************
* BASEOPS 3.00              AIRCRAFT INFORMATION               DATE: 12-12-90 *
* FILE NAME: MCS4                  MCCHORD AFB                       PAGE  4  *
* CASE NAME: MCS4 with final Profiles and Flight Tracks                        *
*****************************************************************************
            Runway : 34
            Length : 10100 ft.    Glide Slope : 2.5 Degrees
     Displacements : TAKEOFF - 200 ft.
                     LANDING - 200 ft.
             Start :  47 Degrees  7  Minutes 16.6 Seconds North Latitude
                     122 Degrees 28  Minutes 30.5 Seconds West Longitude
                     (X = 99992 , Y = 200000 )
               End :  47 Degrees  8  Minutes 56.3 Seconds North Latitude
                     122 Degrees 28  Minutes 31.5 Seconds West Longitude
                     (X = 99923 , Y = 210100 )

=============================================================================
```

BASED AIRCRAFT

AIRCRAFT	PROFILE ID	TRACK ID	TRACK TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
C-130	4LSE	16E	ARRIVAL	0.20		0.00	0.20
C-130	4FSF	16F	ARRIVAL	0.00		0.00	0.00
C-130	4LNE	34E	ARRIVAL	8.47		0.00	8.47
C-130	4FSB	16B	CLOSED	0.00		0.00	0.00
C-130	4TSC	16C	CLOSED	0.40		0.00	0.40
C-130	4FSG	16G	CLOSED	0.00		0.00	0.00
C-130	4GNB	34B	CLOSED	1.73		0.00	1.73
C-130	4TNB	34B	CLOSED	1.27		0.00	1.27
C-130	4FNB	34B	CLOSED	1.33		0.00	1.33
C-130	4LNB	34B	CLOSED	1.00		0.00	1.00
C-130	4TNC	34C	CLOSED	1.33		0.00	1.33
C-130	4FNC	34C	CLOSED	0.87		0.00	0.87
C-130	4GNC	34C	CLOSED	0.87		0.00	0.87
C-130	4LNC	34C	CLOSED	2.00		0.00	2.00
C-130	4FNF	34F	CLOSED	0.20		0.00	0.20
C-130	4FNG	34G	CLOSED	0.27		0.00	0.27
C-130	4TSA	16A	DEPARTURE	0.53		0.00	0.53
C-130	4TSH	16H	DEPARTURE	0.53		0.00	0.53
C-130	4GNA	34A	DEPARTURE	0.27		0.00	0.27
C-130	4TNA	34A	DEPARTURE	4.00		0.00	4.00
C-130	4FNA	34A	DEPARTURE	0.13		0.00	0.13
C-130	4TNH	34H	DEPARTURE	0.20		0.00	0.20
			TOTAL C-130 ARRIVAL				8.67
			TOTAL C-130 DEPARTURE				5.66
			TOTAL C-130 CLOSED PATTERN				11.27
C-141	1LSE	16E	ARRIVAL	0.07		0.00	0.07
C-141	1LSF	16F	ARRIVAL	0.27		0.00	0.27
C-141	1LNE	34E	ARRIVAL	3.27		0.00	3.27
C-141	1MNC	34M	ARRIVAL	1.33		0.00	1.33
C-141	1MNG	34O	ARRIVAL	0.07		0.00	0.07
C-141	1MNF	34P	ARRIVAL	1.27		0.00	1.27
C-141	1GSB	16B	CLOSED	0.73		0.00	0.73
C-141	1TSB	16B	CLOSED	0.47		0.00	0.47
C-141	1FSB	16B	CLOSED	0.40		0.00	0.40
C-141	1FSC	16C	CLOSED	0.60		0.00	0.60
C-141	1GNB	34B	CLOSED	11.47		0.00	11.47
C-141	1TNB	34B	CLOSED	1.53		0.00	1.53
C-141	1FNB	34B	CLOSED	5.07		0.00	5.07
C-141	1LNB	34B	CLOSED	1.87		0.00	1.87
C-141	1TNC	34C	CLOSED	0.20		0.00	0.20
C-141	1FNF	34F	CLOSED	2.93		0.00	2.93
C-141	1FNG	34G	CLOSED	0.40		0.00	0.40
C-141	1FNA	34Q	CLOSED	0.53		0.00	0.53
C-141	1GNA	34Q	CLOSED	1.87		0.00	1.87
C-141	1GNC	34S	CLOSED	2.67		0.00	2.67
C-141	1FNC	34S	CLOSED	0.93		0.00	0.93

AIRCRAFT	PROFILE ID	TRACK ID	TRACK TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
C-141	1LNC	34U	CLOSED	1.27		0.00	1.27
C-141	1TSA	16A	DEPARTURE	0.73		0.00	0.73
C-141	1TSH	16H	DEPARTURE	0.53		0.00	0.53
C-141	1TNA	34A	DEPARTURE	4.47		0.00	4.47
C-141	1TNH	34H	DEPARTURE	0.07		0.00	0.07
			TOTAL C-141 ARRIVAL				6.28
			TOTAL C-141 DEPARTURE				5.80
			TOTAL C-141 CLOSED PATTERN				32.94
F-106	2LSE	16E	ARRIVAL	0.27		0.00	0.27
F-106	2MND	34N	ARRIVAL	1.07		0.00	1.07
F-106	2LNE	34V	ARRIVAL	2.13		0.00	2.13
F-106	2FSB	16B	CLOSED	0.20		0.00	0.20
F-106	2FSD	16D	CLOSED	1.87		0.00	1.87
F-106	2TSD	16D	CLOSED	0.20		0.00	0.20
F-106	2LSD	16D	CLOSED	0.67		0.00	0.67
F-106	2FSG	16G	CLOSED	0.33		0.00	0.33
F-106	2FSH	16Q	CLOSED	0.13		0.00	0.13
F-106	2FNB	34B	CLOSED	1.47		0.00	1.47
F-106	2GNB	34B	CLOSED	0.20		0.00	0.20
F-106	2LNB	34B	CLOSED	0.47		0.00	0.47
F-106	2FNF	34F	CLOSED	0.07		0.00	0.07
F-106	2FNG	34G	CLOSED	0.60		0.00	0.60
F-106	2FNA	34Q	CLOSED	0.33		0.00	0.33
F-106	2GNA	34Q	CLOSED	0.20		0.00	0.20
F-106	2GND	34T	CLOSED	0.60		0.00	0.60
F-106	2LND	34T	CLOSED	2.13		0.00	2.13
F-106	2FND	34W	CLOSED	4.00		0.00	4.00
F-106	2TSA	16A	DEPARTURE	0.33		0.00	0.33
F-106	2TSH	16H	DEPARTURE	0.20		0.00	0.20
F-106	2TNA	34A	DEPARTURE	5.60		0.00	5.60
F-106	2TNH	34H	DEPARTURE	0.13		0.00	0.13
			TOTAL F-106 ARRIVAL				3.47
			TOTAL F-106 DEPARTURE				6.26
			TOTAL F-106 CLOSED PATTERN				13.47
T-33	3LSE	16E	ARRIVAL	0.20		0.00	0.20
T-33	3LNE	34E	ARRIVAL	1.00		0.00	1.00
T-33	3MND	34N	ARRIVAL	1.07		0.00	1.07
T-33	3TSB	16B	CLOSED	0.00		0.00	0.00
T-33	3FSB	16B	CLOSED	0.13		0.00	0.13
T-33	3GSD	16D	CLOSED	0.67		0.00	0.67
T-33	3FSG	16G	CLOSED	0.20		0.00	0.20
T-33	3FNB	34B	CLOSED	0.53		0.00	0.53
T-33	3GND	34D	CLOSED	1.13		0.00	1.13
T-33	3FND	34D	CLOSED	2.40		0.00	2.40
T-33	3LND	34D	CLOSED	1.07		0.00	1.07
T-33	3FNG	34G	CLOSED	0.47		0.00	0.47

AIRCRAFT	PROFILE ID	TRACK ID	TRACK TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
T-33	3TSH	16H	DEPARTURE	0.27		0.00	0.27
T-33	3TNA	34A	DEPARTURE	2.67		0.00	2.67
T-33	3FNH	34H	DEPARTURE	0.13		0.00	0.13
			TOTAL T-33 ARRIVAL				2.27
			TOTAL T-33 DEPARTURE				3.07
			TOTAL T-33 CLOSED PATTERN				6.60

TRANSIENT AIRCRAFT

AIRCRAFT	PROFILE ID	TRACK ID	TRACK TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
C-9	7LNE	34E	ARRIVAL	0.60		0.00	0.60
C-9	7TSB	16B	CLOSED	0.07		0.00	0.07
C-9	7FND	34D	CLOSED	0.07		0.00	0.07
C-9	7TSA	16A	DEPARTURE	0.13		0.00	0.13
C-9	7TSH	16H	DEPARTURE	0.13		0.00	0.13
C-9	7TNA	34A	DEPARTURE	0.33		0.00	0.33
			TOTAL C-9 ARRIVAL				0.60
			TOTAL C-9 DEPARTURE				0.59
			TOTAL C-9 CLOSED PATTERN				0.14
C-130	8LSE	16E	ARRIVAL	0.13		0.00	0.13
C-130	8LNE	34E	ARRIVAL	1.07		0.00	1.07
C-130	8TSB	16B	CLOSED	0.40		0.00	0.40
C-130	8GNB	34B	CLOSED	0.33		0.00	0.33
C-130	8TSA	16A	DEPARTURE	0.33		0.00	0.33
C-130	8TNA	34A	DEPARTURE	0.20		0.00	0.20
C-130	8TNH	34H	DEPARTURE	0.07		0.00	0.07
			TOTAL C-130 ARRIVAL				1.20
			TOTAL C-130 DEPARTURE				0.60
			TOTAL C-130 CLOSED PATTERN				0.73
C-135A	6LSE	16E	ARRIVAL	0.07		0.00	0.07
C-135A	6LNE	34E	ARRIVAL	0.40		0.00	0.40
C-135A	6FNB	34B	CLOSED	0.13		0.00	0.13
C-135A	6TSH	16H	DEPARTURE	0.07		0.00	0.07
C-135A	6TNA	34A	DEPARTURE	0.27		0.00	0.27
			TOTAL C-135A ARRIVAL				0.47
			TOTAL C-135A DEPARTURE				0.34
			TOTAL C-135A CLOSED PATTERN				0.13

AIRCRAFT	PROFILE ID	TRACK ID	TRACK TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
F-5A&B	9LNE	34E	ARRIVAL	0.60		0.00	0.60
F-5A&B	9FND	34D	CLOSED	0.40		0.00	0.40
F-5A&B	9LND	34D	CLOSED	0.13		0.00	0.13
F-5A&B	9TSA	16A	DEPARTURE	0.07		0.00	0.07
F-5A&B	9TNA	34A	DEPARTURE	0.20		0.00	0.20
			TOTAL F-5A&B ARRIVAL				0.60
			TOTAL F-5A&B DEPARTURE				0.27
			TOTAL F-5A&B CLOSED PATTERN				0.53
F-15	5LSE	16E	ARRIVAL	0.40		0.00	0.40
F-15	5LNE	34E	ARRIVAL	0.13		0.00	0.13
F-15	5MND	34N	ARRIVAL	0.53		0.00	0.53
F-15	5TSB	16B	CLOSED	0.13		0.00	0.13
F-15	5FSD	16D	CLOSED	0.47		0.00	0.47
F-15	5LSD	16D	CLOSED	0.33		0.00	0.33
F-15	5FSG	16G	CLOSED	0.13		0.00	0.13
F-15	5FNB	34B	CLOSED	0.07		0.00	0.07
F-15	5FND	34D	CLOSED	0.73		0.00	0.73
F-15	5FNG	34G	CLOSED	0.20		0.00	0.20
F-15	5LND	34T	CLOSED	0.73		0.00	0.73
F-15	5TSH	16H	DEPARTURE	0.07		0.00	0.07
F-15	5TNA	34A	DEPARTURE	1.47		0.00	1.47
			TOTAL F-15 ARRIVAL				1.06
			TOTAL F-15 DEPARTURE				1.54
			TOTAL F-15 CLOSED PATTERN				2.79

Flight Profile : 1FNA for a BASED C-141
On Flight Track 34Q
flyby modif./3/4 TRK mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	500	1.33 EPR	200
04	3300	500	1.33 EPR	200
04	10000	500	1.33 EPR	200
04	20000	1000	1.33 EPR	200
04	25000	2000	1.33 EPR	200
06	89200	10000	1.2 EPR	200
04	270000	10000	1.2 EPR	200
04	300000	2000	1.33 EPR	200
04	349962	500	1.33 EPR	200

Flight Profile : 1FNB for a BASED C-141
On Flight Track 34B
flyby modif./3/4 mod pwr over ST7&9

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	1000	1.5 EPR	160
04	11000	1000	1.5 EPR	160
06	20000	3000	1.25 EPR	163
06	30000	3000	1.25 EPR	200
05	167000	3000	1.5 EPR	163
04	227373	1000	1.5 EPR	163

Flight Profile : 1FNC for a BASED C-141
On Flight Track 34S
flyby modif./3/moved 1500 ft mod 4

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
06	0	1500	1.2 EPR	160
06	3300	1500	1.2 EPR	160
06	81962	1500	1.2 EPR	160

Flight Profile : 1FNF for a BASED C-141
On Flight Track 34F
Circle approach
modified to closed track

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	880	1.33 EPR	143
05	14570	880	1.33 EPR	143
05	36849	880	1.33 EPR	143

Flight Profile : 1FNG for a BASED C-141
On Flight Track 34G
Overhead approach
modified to closed track

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	1500	1.33 EPR	143
05	15180	1500	1.33 EPR	143
05	30362	1500	1.33 EPR	143

Flight Profile : 1FSB for a BASED C-141
On Flight Track 16B
flyby modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	200	1.5 EPR	160
04	3300	200	1.5 EPR	160
04	10000	1000	1.25 EPR	163
04	20000	3000	1.25 EPR	163
04	142020	3000	1.25 EPR	163
04	220000	800	1.5 EPR	160
04	231350	200	1.5 EPR	160

Flight Profile : 1FSC for a BASED C-141
On Flight Track 16C
flyby and touch-n-go modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	133
03	3300	0	1.8 EPR	114
03	10100	500	1.8 EPR	114
04	16100	1500	1.25 EPR	163
05	58582	1500	1.3 EPR	163
05	63922	1100	1.33 EPR	143
05	74462	800	1.3 EPR	133
05	84962	50	1.3 EPR	133

Flight Profile : 1GNA for a BASED C-141
On Flight Track 34Q
cy 1TNA /3 and mod to TG/4

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	50	1.9 EPR	140
03	3300	0	1.77 EPR	114
03	10000	700	1.77 EPR	135
03	20000	1600	1.77 EPR	173
04	25000	2300	1.5 EPR	163
06	89200	10000	1.2 EPR	200
06	200000	10000	1.2 EPR	200
05	292000	2700	1.3 EPR	163
05	349962	50	1.3 EPR	140

Flight Profile : 1GNB for a BASED C-141
On Flight Track 34B
touch-n-go modif./3/4 mod pwr to fit ST7&9

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	133
03	3300	0	1.8 EPR	114
03	11000	700	1.8 EPR	150
03	20000	1600	1.8 EPR	173
04	30000	2600	1.3 EPR	163
05	34000	3000	1.3 EPR	163
05	138043	3000	1.3 EPR	163
05	166700	2700	1.3 EPR	163
04	210000	600	1.56 EPR	143
03	227373	50	1.9 EPR	133

Flight Profile : 1GNC for a BASED C-141
On Flight Track 34S
touch-n-go modif./3/ moved 1500 ft mod4

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	133
03	3300	0	1.77 EPR	114
03	10100	500	1.77 EPR	173
04	16100	1500	1.33 EPR	200
05	57100	1500	1.3 EPR	163
05	64022	1100	1.3 EPR	143
05	74662	800	1.25 EPR	133
05	81962	50	1.25 EPR	133

Flight Profile : 1GSB for a BASED C-141
On Flight Track 16B
Tacoma east pattern, combines 16B+16B1 profiles.
touch-n-go modif./3/4 pwr ST7&8

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	133
03	3300	0	1.77 EPR	114
03	10000	900	1.7 EPR	173
03	20000	1600	1.7 EPR	173
04	30000	2600	1.25 EPR	163
04	34000	3000	1.25 EPR	163
05	142020	3000	1.3 EPR	143
05	231350	50	1.25 EPR	133

Flight Profile : 1LNB for a BASED C-141
On Flight Track 34B
ST8 mod/4 ST9 adj

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	3000	1.33 EPR	200
05	138043	3000	1.33 EPR	200
05	160000	2700	1.33 EPR	163
05	210000	800	1.25 EPR	133
05	227373	50	1.25 EPR	133

Flight Profile : 1LNC for a BASED C-141
On Flight Track 34U
ST8 mod /4 mod to new TRK 2X pwr

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	1500	1.1 EPR	200
04	20000	1500	1.1 EPR	200
05	57600	1500	1.1 EPR	200
05	69500	800	1.2 EPR	163
05	79962	50	1.2 EPR	133

Flight Profile : 1LNE for a BASED C-141
On Flight Track 34E
Straight in approach/4 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	1.25 EPR	133
05	60761	2703	1.3 EPR	163
05	121774	10000	1.3 EPR	163
04	200000	10000	1.25 EPR	163

Flight Profile : 1LSE for a BASED C-141
On Flight Track 16E
straight in approach/3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	1.25 EPR	133
05	39455	2100	1.3 EPR	145
05	105983	10000	1.3 EPR	163
05	200000	10000	1.3 EPR	163

Flight Profile : 1LSF for a BASED C-141
On Flight Track 16F
Circle approach

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	1.25 EPR	133
05	14570	636	1.25 EPR	133
05	31340	880	1.33 EPR	143
05	96056	3390	1.3 EPR	163
04	131720	10000	1.25 EPR	163
04	200000	10000	1.25 EPR	163

Flight Profile : 1MNC for a BASED C-141
On Flight Track 34M
mod 4 new MA profile (~34S) pwr

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
06	0	1500	1.1 EPR	163
06	40000	1500	1.1 EPR	163
04	77000	1000	1.33 EPR	163
03	82000	500	1.7 EPR	173
05	146000	2700	1.33 EPR	163
05	210000	10000	1.3 EPR	200

Flight Profile : 1MNF for a BASED C-141
On Flight Track 34P
new TRK + profile /4 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	880	1.33 EPR	143
05	37000	880	1.33 EPR	143
05	97000	2700	1.3 EPR	163
05	158000	10000	1.3 EPR	200
04	300000	10000	1.25 EPR	250

Flight Profile : 1MNG for a BASED C-141
On Flight Track 340
new TRK + profile /4

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	1500	1.3 EPR	143
05	31000	1500	1.3 EPR	143
05	91000	2700	1.3 EPR	163
05	152000	10000	1.3 EPR	200
04	300000	10000	1.25 EPR	200

Flight Profile : 1TNA for a BASED C-141
On Flight Track 34A
Standard instrument departure
take-off modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	0
03	3300	0	1.77 EPR	114
03	10000	700	1.77 EPR	135
03	20000	1600	1.77 EPR	173
04	25000	2300	1.25 EPR	163
04	89200	10000	1.33 EPR	200
04	200000	10000	1.33 EPR	200

Flight Profile : 1TNB for a BASED C-141
On Flight Track 34B
Tacoma east pattern, combines 34B+34B1 profiles.
take-off modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	0
03	3300	0	1.77 EPR	114
03	10000	900	1.77 EPR	150
03	20000	1600	1.77 EPR	173
04	30000	2600	1.33 EPR	200
04	34000	3000	1.25 EPR	163
04	138043	3000	1.25 EPR	163
04	227373	3000	1.25 EPR	163

Flight Profile : 1TNC for a BASED C-141
On Flight Track 34C
VFR pattern (old 34C+34C1)
take-off modif./4 mod to pwr over ST8

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	0
03	3300	0	1.77 EPR	114
03	10100	900	1.77 EPR	150
03	16100	1500	2 EPR	173
06	58582	3000	1.1 EPR	200
06	84962	3000	1.1 EPR	200

Flight Profile : 1TNH for a BASED C-141
On Flight Track 34H
Straight out departure
take-off modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	0
03	3300	0	1.77 EPR	114
03	10000	900	1.77 EPR	135
03	20000	1600	1.77 EPR	173
04	34000	3000	1.25 EPR	163
04	89200	10000	1.33 EPR	200
04	200000	10000	1.33 EPR	200

Flight Profile : 1TSA for a BASED C-141
On Flight Track 16A
Standard instrument departure
take-off modif

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	0
03	3300	0	1.77 EPR	114
03	10000	900	1.77 EPR	135
03	20000	1600	1.77 EPR	173
04	34000	3000	1.25 EPR	163
04	89200	10000	1.33 EPR	200
04	200000	10000	1.33 EPR	200

Flight Profile : 1TSB for a BASED C-141
On Flight Track 16B
Tacoma east pattern, combines 16B+16B1 profiles.
take-off modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	0
03	3300	0	1.9 EPR	114
03	10000	900	1.77 EPR	135
03	20000	1600	1.77 EPR	173
04	30000	2600	1.33 EPR	200
04	34000	3000	1.25 EPR	163
04	142020	3000	1.25 EPR	163
04	231350	3000	1.25 EPR	163

Flight Profile : 1TSH for a BASED C-141
On Flight Track 16H
Straight out departure
take-off modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.9 EPR	0
03	3300	0	1.77 EPR	114
03	10000	900	1.77 EPR	135
03	20000	1600	1.77 EPR	173
04	34000	3000	1.25 EPR	163
04	89200	10000	1.33 EPR	200
04	200000	10000	1.33 EPR	200

Flight Profile : 2FNA for a BASED F-106
On Flight Track 34Q
flyby modif./PMA alt. 3/TRK mod 4

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	220	94 % RPM	200
05	4500	220	94 % RPM	200
05	10000	220	94 % RPM	200
05	16200	1000	93 % RPM	200
05	34000	3000	93 % RPM	250
06	67400	10000	86 % RPM	250
05	260000	10000	93 % RPM	250
05	310000	2500	94 % RPM	200
05	349962	220	94 % RPM	200

Flight Profile : 2FNB for a BASED F-106
On Flight Track 34B
flyby modif./PMA alt. 3/4 perf

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	90	93 % RPM	200
05	4500	90	93 % RPM	200
05	20000	3000	93 % RPM	250
05	173400	3000	93 % RPM	200
05	210000	250	93 % RPM	200
05	227373	90	93 % RPM	200

Flight Profile : 2FND for a BASED F-106
On Flight Track 34W
flyby modif./PMA alt. 3/4 new TRK 2X

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	80	93 % RPM	200
05	13100	80	93 % RPM	200
05	19069	2000	93 % RPM	250
05	43000	2000	93 % RPM	200
05	58400	250	93 % RPM	200
05	68032	80	93 % RPM	200

Flight Profile : 2FNF for a BASED F-106
On Flight Track 34F
Circle approach
modified to closed track

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	1000	93 % RPM	200
05	14570	1000	93 % RPM	200
05	36849	1000	93 % RPM	200

Flight Profile : 2FNG for a BASED F-106
On Flight Track 34G
Overhead approach
flyby modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	200	93 % RPM	200
05	15180	1000	93 % RPM	200
05	30362	200	93 % RPM	200

Flight Profile : 2FSB for a BASED F-106
On Flight Track 16B
all ops included in modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
01	0	0	108 % RPM	0
01	4500	0	108 % RPM	175
03	10000	1400	106 % RPM	175
03	16200	3000	106 % RPM	200
05	142020	3000	90 % RPM	200
05	231350	50	93 % RPM	200

Flight Profile : 2FSD for a BASED F-106
On Flight Track 16D
flyby and touch-n-go modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	100	106 % RPM	175
03	4500	0	106 % RPM	175
03	13100	500	106 % RPM	200
05	19069	2000	93 % RPM	200
05	41169	2000	93 % RPM	200
05	47138	450	95 % RPM	200
05	56138	50	95 % RPM	175

Flight Profile : 2FSG for a BASED F-106
On Flight Track 16G
Overhead approach
modif. to closed track/PMA alt. 3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	160	93 % RPM	200
05	15180	1000	93 % RPM	200
05	30362	160	93 % RPM	200

Flight Profile : 2FSH for a BASED F-106
On Flight Track 16Q
flyby modif./PMA alt. 3/TRK mod 4 pwr

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	100	93 % RPM	200
05	25000	100	93 % RPM	200
05	40000	5000	93 % RPM	200
05	67400	10000	93 % RPM	200
05	315000	10000	93 % RPM	200
05	349962	100	93 % RPM	200

Flight Profile : 2GNA for a BASED F-106
On Flight Track 34Q
touch-n-go modif./3/4 new TRK! +pwr mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
01	0	50	108 % RPM	200
01	4500	0	108 % RPM	175
03	11000	1000	106 % RPM	175
03	16200	3000	106 % RPM	200
03	34000	4000	106 % RPM	350
06	67400	10000	86.5 % RPM	250
05	200000	10000	93 % RPM	250
05	302000	2500	100 % RPM	200
05	349962	50	93 % RPM	200

Flight Profile : 2GNB for a BASED F-106
On Flight Track 34B
Tacoma east pattern (old 34B+34B1)
touch-n-go modif./3/4

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
01	0	50	108 % RPM	160
01	4500	0	108 % RPM	175
03	11000	1000	106 % RPM	175
05	16200	3000	93 % RPM	200
05	20000	3000	93 % RPM	200
06	34000	3000	93 % RPM	250
05	138043	3000	93 % RPM	200
05	180000	2500	100 % RPM	200
05	227373	50	93 % RPM	160

Flight Profile : 2GND for a BASED F-106
On Flight Track 34T
TG mod /4 pwr mod (1 TO incl), + new TRK

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	106 % RPM	145
03	4500	0	106 % RPM	175
03	13100	2000	93 % RPM	200
05	41000	2000	96 % RPM	200
05	56000	250	96 % RPM	181
05	65236	50	96 % RPM	145

Flight Profile : 2LNB for a BASED F-106
On Flight Track 34B
ST8 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
06	0	3000	87 % RPM	325
05	138000	3000	88 % RPM	325
05	218400	450	88 % RPM	200
05	227373	50	88 % RPM	145

Flight Profile : 2LND for a BASED F-106
On Flight Track 34T
ST8 mod/4 to fit ST7&8 +TRK mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
06	0	2000	83 % RPM	300
05	41000	2000	93 % RPM	250
05	43000	1700	93 % RPM	200
05	55000	450	88 % RPM	181
05	65236	50	88 % RPM	145

Flight Profile : 2LNE for a BASED F-106
On Flight Track 34V
landing same pwr./3/4 moved to 34V

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	93 % RPM	170
05	20000	750	93 % RPM	170
05	60761	2400	93 % RPM	200
06	121774	10000	86 % RPM	200
06	200000	10000	86 % RPM	250

Flight Profile : 2LSD for a BASED F-106
On Flight Track 16D
ST8 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
06	0	2000	86 % RPM	325
05	41200	2000	88 % RPM	325
05	47138	450	88 % RPM	200
05	56138	50	88 % RPM	145

Flight Profile : 2LSE for a BASED F-106
On Flight Track 16E
straight in approach
/3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	90 % RPM	200
05	39455	2067	90 % RPM	200
06	105983	10000	86 % RPM	200
06	200000	10000	86 % RPM	250

Flight Profile : 2MND for a BASED F-106
On Flight Track 34N
use 2GND and mod 4, moved to new TRK ST8 data

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	80	93 % RPM	200
05	12000	250	93 % RPM	200
05	40000	2000	93 % RPM	250
03	53000	1700	106 % RPM	175
03	60400	80	106 % RPM	175
05	65000	200	93 % RPM	175
05	116000	2000	93 % RPM	200
06	177000	10000	86 % RPM	250
06	300000	10000	86 % RPM	250

Flight Profile : 2TNA for a BASED F-106
On Flight Track 34A
std instr departure (90 deg LH)
takeoff modif./3/4 T.O.R. shut OFF!

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
01	0	0	108 % RPM	20
01	4500	0	108 % RPM	175
03	11000	1000	106 % RPM	175
03	16200	3000	106 % RPM	200
03	34000	4000	106 % RPM	350
06	67400	10000	93 % RPM	250
06	200000	10000	93 % RPM	250

Flight Profile : 2TNH for a BASED F-106
On Flight Track 34H
straight out departure
takeoff modif./3/4 adj

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
01	0	0	108 % RPM	0
01	4500	0	108 % RPM	175
03	12000	1000	106 % RPM	220
03	16200	2000	106 % RPM	350
03	34000	4000	106 % RPM	350
05	67400	10000	93 % RPM	200
05	200000	10000	93 % RPM	200

Flight Profile : 2TSA for a BASED F-106
On Flight Track 16A
takeoff modif./3/4

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
01	0	0	108 % RPM	0
01	4500	0	108 % RPM	170
03	11000	1000	106 % RPM	170
03	16200	3000	106 % RPM	250
03	34000	4000	106 % RPM	350
03	67400	10000	93 % RPM	350
03	200000	10000	93 % RPM	350

Flight Profile : 2TSD for a BASED F-106
On Flight Track 16D
ST8 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
01	0	0	108 % RPM	0
01	4100	0	108 % RPM	184
03	8500	90	106 % RPM	300
03	13100	500	106 % RPM	300
06	27000	2000	86 % RPM	325
06	56138	2000	86 % RPM	325

Flight Profile : 2TSH for a BASED F-106
On Flight Track 16H
takeoff modif./3/4 TRK moved 16H

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
01	0	0	108 % RPM	0
01	4500	0	108 % RPM	170
03	11000	1000	106 % RPM	170
03	16200	3000	106 % RPM	250
03	34000	4000	106 % RPM	350
03	67400	10000	93 % RPM	350
03	200000	10000	93 % RPM	350

Flight Profile : 3FNB for a BASED T-33
On Flight Track 34B
Tacoma east pattern (old 34B+34B1)
low flyby modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	1000	80 % RPM	200
04	4500	1000	80 % RPM	200
04	16200	1000	80 % RPM	200
04	138043	1000	80 % RPM	200
04	227373	1000	80 % RPM	200

Flight Profile : 3FND for a BASED T-33
On Flight Track 34D
VFR closed loop (old 34D+34D1), innermost loop.
flyby modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	2000	80 % RPM	200
04	5000	2000	80 % RPM	200
04	13100	2000	80 % RPM	200
04	19069	2000	80 % RPM	200
04	40969	2000	80 % RPM	200
04	46938	2000	80 % RPM	200
04	55938	2000	80 % RPM	200

Flight Profile : 3FNG for a BASED T-33
On Flight Track 34G
Overhead approach
closed trk flyby modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	2000	80 % RPM	125
05	15180	2000	80 % RPM	125
05	30362	2000	80 % RPM	125

Flight Profile : 3FNH for a BASED T-33
On Flight Track 34H
straight out departure
flyby modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	3000	90 % RPM	200
04	5000	3000	90 % RPM	200
04	15000	3000	90 % RPM	200
04	34000	3000	90 % RPM	250
04	104200	10000	90 % RPM	300
04	200000	10000	90 % RPM	300

Flight Profile : 3FSB for a BASED T-33
On Flight Track 16B
ST8 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	1000	90 % RPM	200
04	231350	1000	90 % RPM	200

Flight Profile : 3FSG for a BASED T-33
On Flight Track 16G
Overhead approach
modif to closed track flyby

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	2000	80 % RPM	125
05	15180	2000	80 % RPM	125
05	30362	2000	80 % RPM	125

Flight Profile : 3GND for a BASED T-33
On Flight Track 34D
VFR closed loop (old 34D+34D1), innermost loop.
touch-n-go modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	100 % RPM	125
03	5000	0	95 % RPM	200
03	13100	500	95 % RPM	150
05	19069	2000	80 % RPM	125
05	40969	2000	80 % RPM	125
05	46938	450	80 % RPM	125
05	55938	50	80 % RPM	125

Flight Profile : 3GSD for a BASED T-33
On Flight Track 16D
VFR closed loop (old 16D+16D1), innermost loop.
flyby and touch-n-go modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	100 % RPM	0
03	5000	0	100 % RPM	125
03	13100	500	95 % RPM	150
05	19069	2000	80 % RPM	200
05	41169	2000	80 % RPM	125
05	47138	450	80 % RPM	125
05	56138	50	80 % RPM	125

Flight Profile : 3LND for a BASED T-33
On Flight Track 34D
ST8 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	2000	90 % RPM	300
05	41000	2000	80 % RPM	300
05	46938	450	80 % RPM	150
05	55938	50	80 % RPM	125

Flight Profile : 3LNE for a BASED T-33
On Flight Track 34E
Straight in approach
modif./ 4 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	85 % RPM	125
05	60761	2703	85 % RPM	125
05	121774	10000	80 % RPM	220
04	200000	10000	90 % RPM	300

Flight Profile : 3LSE for a BASED T-33
On Flight Track 16E
straight in approach
modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	80 % RPM	125
05	39455	2067	80 % RPM	125
05	105983	10000	80 % RPM	125
04	200000	10000	90 % RPM	300

Flight Profile : 3MND for a BASED T-33
On Flight Track 34N
/4 mod combines 3FND + 3LNE (TRK moved w/o need)

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	2000	80 % RPM	200
05	66000	2000	80 % RPM	200
05	111000	2000	85 % RPM	125
05	176000	10000	85 % RPM	250
04	300000	10000	90 % RPM	300

Flight Profile : 3TNA for a BASED T-33
On Flight Track 34A
takeoff modif incl 3 to 34H./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	100 % RPM	0
03	5000	0	100 % RPM	125
03	11000	350	100 % RPM	125
03	34000	3000	95 % RPM	200
04	104000	10000	90 % RPM	250
04	200000	10000	90 % RPM	300

Flight Profile : 3TSB for a BASED T-33
On Flight Track 16B
Tacoma east pattern (old 16B+16B1)
no modif. no a/c

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	100 % RPM	0
03	4500	0	100 % RPM	200
05	16200	3000	80 % RPM	125
05	142020	3000	80 % RPM	125
05	231350	50	80 % RPM	125

Flight Profile : 3TSH for a BASED T-33
On Flight Track 16H
straight out departure
takeoff modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	100 % RPM	0
03	5000	0	100 % RPM	125
03	10000	350	100 % RPM	150
03	34000	3000	95 % RPM	200
04	104200	10000	90 % RPM	300
04	200000	10000	90 % RPM	300

Flight Profile : 4FNA for a BASED C-130
On Flight Track 34A
Std instr departure (90 deg LH)
flyby modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	3000	600 C TIT	170
03	34000	3000	600 C TIT	170
03	163000	10000	600 C TIT	170
03	200000	10000	600 C TIT	170

Flight Profile : 4FNB for a BASED C-130
On Flight Track 34B
Tacoma east pattern (old 34B+34B1)
flyby modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	3000	600 C TIT	170
05	30500	3000	600 C TIT	170
05	227373	3000	600 C TIT	170

Flight Profile : 4FNC for a BASED C-130
On Flight Track 34C
flyby modif. /4 mod pwr over ST8..

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	1500	500 C TIT	200
05	16100	1500	500 C TIT	200
05	58000	3000	500 C TIT	200
05	84962	3000	500 C TIT	200

Flight Profile : 4FNF for a BASED C-130
On Flight Track 34F
Circle approach

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	600 C TIT	130
05	14570	636	600 C TIT	130
05	36849	880	600 C TIT	140

Flight Profile : 4FNG for a BASED C-130
On Flight Track 34G
Overhead approach

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	600 C TIT	130
05	15180	610	600 C TIT	130
05	30362	1500	600 C TIT	140

Flight Profile : 4FSB for a BASED C-130
On Flight Track 16B
Tacoma east pattern (old 16B+16B1)
Did not change pwr/airspeed to Norton data

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	170
03	3300	0	970 C TIT	170
03	10000	900	970 C TIT	170
03	20000	1600	970 C TIT	170
05	30500	2650	580 C TIT	140
05	34000	3000	580 C TIT	140
05	142020	3000	580 C TIT	140
05	231350	50	580 C TIT	140

Flight Profile : 4FSF for a BASED C-130
On Flight Track 16F
Circle approach
Did not change pwr/airspeed to Norton data.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	580 C TIT	140
05	14570	636	580 C TIT	140
05	31340	880	580 C TIT	140
05	96056	3390	580 C TIT	140
05	131720	10000	580 C TIT	140
05	200000	10000	580 C TIT	140

Flight Profile : 4FSG for a BASED C-130
On Flight Track 16G
Overhead approach
Did not change pwr/airspeed to Norton data

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	580 C TIT	140
05	15180	610	580 C TIT	140
05	30362	1500	580 C TIT	140

Flight Profile : 4GNA for a BASED C-130
On Flight Track 34A
Std instr departure (90 deg LH)
touch and go modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	0
03	3300	0	970 C TIT	170
03	10000	800	970 C TIT	170
03	20000	1600	970 C TIT	170
03	34000	3000	970 C TIT	170
03	163000	10000	900 C TIT	170
03	200000	10000	900 C TIT	170

Flight Profile : 4GNB for a BASED C-130
On Flight Track 34B
Tacoma east pattern (old 34B+34B1)
touch and go modification

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	170
03	3300	0	950 C TIT	180
03	10000	900	600 C TIT	170
03	20000	1600	600 C TIT	170
05	30500	2650	600 C TIT	170
05	34000	3000	600 C TIT	150
05	138043	3000	600 C TIT	150
05	227373	50	600 C TIT	130

Flight Profile : 4GNC for a BASED C-130
On Flight Track 34C
VFR pattern (old 34C+34C1)
touch and go modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	170
03	3300	0	950 C TIT	180
03	10100	500	600 C TIT	170
05	16100	1500	600 C TIT	170
05	58582	1500	600 C TIT	170
05	63922	1100	600 C TIT	170
05	74462	800	600 C TIT	150
05	84962	50	600 C TIT	130

Flight Profile : 4LNB for a BASED C-130
On Flight Track 34B
ST8 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	3000	580 C TIT	210
05	138000	3000	580 C TIT	210
05	227373	50	580 C TIT	140

Flight Profile : 4LNC for a BASED C-130
On Flight Track 34C
ST8 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	1500	580 C TIT	210
05	58582	1500	580 C TIT	210
05	63922	1500	500 C TIT	170
05	74462	800	500 C TIT	150
05	84962	50	580 C TIT	130

Flight Profile : 4LNE for a BASED C-130
On Flight Track 34E
Straight in approach

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	600 C TIT	130
05	60761	2703	600 C TIT	150
05	121774	10000	600 C TIT	170
05	200000	10000	600 C TIT	170

Flight Profile : 4LSE for a BASED C-130
On Flight Track 16E
straight in approach

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	600 C TIT	130
05	39455	2067	600 C TIT	150
05	105983	10000	600 C TIT	170
05	200000	10000	600 C TIT	170

Flight Profile : 4TNA for a BASED C-130
On Flight Track 34A
Std instr departure (90 deg LH)
take-off and touch-n-go modif./3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	0
03	3300	0	970 C TIT	170
03	10000	400	970 C TIT	180
03	20000	1600	950 C TIT	170
03	34000	3000	950 C TIT	170
03	163000	10000	900 C TIT	170
03	200000	10000	900 C TIT	170

Flight Profile : 4TNB for a BASED C-130
On Flight Track 34B
Tacoma east pattern (old 34B+34B1)
take off modif.

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	0
03	3300	0	970 C TIT	170
03	10000	900	950 C TIT	180
03	20000	1600	600 C TIT	170
05	34000	3000	600 C TIT	170
05	227373	3000	600 C TIT	170

Flight Profile : 4TNC for a BASED C-130
On Flight Track 34C
VFR pattern (old 34C+34C1)
take off modif./4 pwr mod over ST8

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	0
03	3300	0	970 C TIT	170
03	10100	500	950 C TIT	180
05	16100	1500	500 C TIT	200
05	58000	3000	500 C TIT	200
05	84962	3000	500 C TIT	200

Flight Profile : 4TNH for a BASED C-130
On Flight Track 34H
straight out departure

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	0
03	3300	0	970 C TIT	170
03	10000	500	950 C TIT	170
03	20000	1600	950 C TIT	170
03	34000	3000	900 C TIT	170
03	163000	10000	900 C TIT	170
03	200000	10000	900 C TIT	170

Flight Profile : 4TSA for a BASED C-130
On Flight Track 16A
Std instr departure (90 deg LH)
/3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	C	0	970 C TIT	0
03	3300	0	970 C TIT	170
03	10000	400	970 C TIT	180
03	20000	1600	900 C TIT	170
03	34000	3000	900 C TIT	170
03	163000	10000	600 C TIT	170
03	200000	10000	600 C TIT	170

Flight Profile : 4TSC for a BASED C-130
On Flight Track 16C
VFR pattern (old 16C+16C1)

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	0
03	3300	0	950 C TIT	170
03	10100	500	950 C TIT	180
05	16100	1500	600 C TIT	170
05	58582	1500	600 C TIT	170
05	63922	1100	600 C TIT	150
05	74462	800	600 C TIT	150
05	84962	50	600 C TIT	130

Flight Profile : 4TSH for a BASED C-130
On Flight Track 16H
straight out departure/4 pwr mod ST9

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	0
03	3300	0	970 C TIT	170
03	10000	500	970 C TIT	180
03	20000	1600	950 C TIT	170
03	42000	3000	950 C TIT	170
03	89200	10000	600 C TIT	170
03	200000	10000	600 C TIT	170

Flight Profile : 5FNB for a TRANSIENT F-15
On Flight Track 34B
new flyby/ 3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	300	75 % RPM	250
04	30000	3000	75 % RPM	300
04	200000	3000	75 % RPM	300
04	227373	300	75 % RPM	250

Flight Profile : 5FND for a TRANSIENT F-15
On Flight Track 34D
new flyby/PMA alt. 3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	100	75 % RPM	250
04	30000	3000	75 % RPM	250
04	55938	100	75 % RPM	250

Flight Profile : 5FNG for a TRANSIENT F-15
On Flight Track 34G
closed flyby on landing

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	1000	75 % RPM	170
05	30362	1000	75 % RPM	170

Flight Profile : 5FSD for a TRANSIENT F-15
On Flight Track 16D
flyby, w/1 TO, new/PMA alt. 3/4 ST1

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	200	80 % RPM	250
05	3000	200	75 % RPM	250
05	10100	1000	75 % RPM	250
05	27340	3000	75 % RPM	300
05	50000	1000	80 % RPM	250
05	56138	200	80 % RPM	250

Flight Profile : 5FSG for a TRANSIENT F-15
On Flight Track 16G
new flyby in closed trk

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	1000	75 % RPM	170
05	30362	1000	75 % RPM	170

Flight Profile : 5LND for a TRANSIENT F-15
On Flight Track 34T
/4 mod + new TRK pwr

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	2000	73.5 % RPM	250
05	40000	2000	81 % RPM	200
05	55000	250	75 % RPM	180
05	65236	50	75 % RPM	150

Flight Profile : 5LNE for a TRANSIENT F-15
On Flight Track 34E
new landing on 2 deg G.S./4 mods

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	75 % RPM	170
05	10000	350	75 % RPM	170
04	280000	10000	73.5 % RPM	250

Flight Profile : 5LSD for a TRANSIENT F-15
On Flight Track 16D
ST8 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	2000	75 % RPM	250
05	56138	50	75 % RPM	150

Flight Profile : 5LSE for a TRANSIENT F-15
On Flight Track 16E
new profile using 2 deg glide

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	75 % RPM	170
05	280000	10000	75 % RPM	170

Flight Profile : 5MND for a TRANSIENT F-15
On Flight Track 34N
/4 mod (TRK moved w/o need)

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	100	75 % RPM	200
05	66000	100	75 % RPM	200
05	300000	10000	75 % RPM	200

Flight Profile : 5TNA for a TRANSIENT F-15
On Flight Track 34A
adjusted to MCSS data/3/4 T.O.R. shut OFF!

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
01	0	0	91 % RPM	10
01	3000	0	91 % RPM	170
03	10100	800	90 % RPM	200
03	27340	3000	90 % RPM	250
04	51660	5650	73.5 % RPM	300
04	200000	6000	73.5 % RPM	300

Flight Profile : 5TSB for a TRANSIENT F-15
On Flight Track 16B
uses typical departure profile/3?

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	90 % RPM	0
03	3000	0	90 % RPM	150
03	10100	900	90 % RPM	200
03	27340	3000	77.9 % RPM	300
04	51660	5650	73.5 % RPM	300
04	231350	6000	73.5 % RPM	300

Flight Profile : 5TSH for a TRANSIENT F-15
On Flight Track 16H
ST8 mod/4 pwr

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	90 % RPM	0
03	3000	0	90 % RPM	150
03	10100	900	90 % RPM	200
03	27000	3000	77.9 % RPM	300
04	40000	6000	73.5 % RPM	300
04	200000	6000	73.5 % RPM	300

Flight Profile : 6FNB for a TRANSIENT C-135A
On Flight Track 34B
new flyby

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	3000	1.5 EPR	300
04	227373	3000	1.5 EPR	300

Flight Profile : 6LNE for a TRANSIENT C-135A
On Flight Track 34E
/4 perf mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	1.75 EPR	160
05	10000	350	1.75 EPR	160
04	280000	10000	1.2 EPR	280

Flight Profile : 6LSE for a TRANSIENT C-135A
On Flight Track 16E
ST8 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	1.75 EPR	160
05	280000	10000	1.75 EPR	300

Flight Profile : 6TNA for a TRANSIENT C-135A
On Flight Track 34A
adjusted to MCSS data/3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
02	0	0	2.85 EPR	0
02	8000	0	2.85 EPR	170
03	11000	600	2.45 EPR	200
03	17152	2600	2.2 EPR	250
03	29300	4000	2.2 EPR	250
04	53600	5600	1.5 EPR	250
04	200000	6000	1.5 EPR	300

Flight Profile : 6TSH for a TRANSIENT C-135A
On Flight Track 16H
takeoff to south/3 dupl

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
02	0	0	2.85 EPR	0
02	8000	0	2.85 EPR	170
03	11000	1000	2.2 EPR	200
03	17152	2600	2.2 EPR	250
03	29300	4000	2.2 EPR	250
04	53600	5600	1.5 EPR	250
04	200000	6000	1.5 EPR	300

Flight Profile : 7FND for a TRANSIENT C-9
On Flight Track 34D
std. instr. departure (90 deg LH)
C-9 noise curve used for C9/A, C9, and C9F a/c
modif to incl C9,C5,S3A
flyby

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
06	0	3000	1.8 EPR	250
06	55938	3000	1.8 EPR	250

Flight Profile : 7LNE for a TRANSIENT C-9
On Flight Track 34E
Straight in approach
C-9 noise curve used for C9/A, C9, and C9F a/c
modif to incl C9,C5,S3A, same alt/pwr profiles

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	1.35 EPR	160
05	60761	2703	1.35 EPR	160
05	121774	10000	1.35 EPR	160
05	200000	10000	1.35 EPR	160

Flight Profile : 7TNA for a TRANSIENT C-9
On Flight Track 34A
modif to incl C9,C5,S3A same pwr/alt profile

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.97 EPR	0
03	4250	0	1.97 EPR	160
03	15000	1000	1.97 EPR	250
03	34000	3000	1.97 EPR	250
03	158000	10000	1.97 EPR	250
03	200000	10000	1.97 EPR	250

Flight Profile : 7TSA for a TRANSIENT C-9
On Flight Track 16A
modif to incl C9,C5,S3A/4 perf mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	2.2 EPR	0
03	4250	0	2.2 EPR	145
03	20000	800	1.97 EPR	160
03	34000	2000	1.97 EPR	250
06	158000	10000	1.70 EPR	300
06	200000	10000	1.70 EPR	300

Flight Profile : 7TSB for a TRANSIENT C-9
On Flight Track 16B
modif to incl C9,C5,S3A same alt/pwr profiles

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.97 EPR	0
03	4250	0	1.97 EPR	160
03	15000	1000	1.97 EPR	250
05	30000	2579	1.35 EPR	200
05	34000	3000	1.35 EPR	200
05	231350	3000	1.35 EPR	200

Flight Profile : 7TSH for a TRANSIENT C-9
On Flight Track 16H
modif to incl C9,C5,S3A/4 perf mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	1.97 EPR	0
03	4250	0	1.97 EPR	160
03	15000	1000	1.97 EPR	160
03	34000	2000	1.97 EPR	250
06	158000	10000	1.70 EPR	300
06	200000	10000	1.70 EPR	300

Flight Profile : 8GNB for a TRANSIENT C-130
On Flight Track 34B
modif to incl P3,L188,L382,C118
Bad a/c to model data

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	170
03	3000	0	970 C TIT	170
03	10000	800	970 C TIT	170
05	31000	3000	580 C TIT	140
05	138043	3000	580 C TIT	140
05	227373	50	580 C TIT	140

Flight Profile : 8LNE for a TRANSIENT C-130
On Flight Track 34E
modif to incl P3,L188,L382,C118
Bad a/c to model

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	580 C TIT	140
05	60761	2703	580 C TIT	140
05	121774	10000	580 C TIT	140
05	200000	10000	580 C TIT	140

Flight Profile : 8LSE for a TRANSIENT C-130
On Flight Track 16E
modif to incl P3,L188,L382,C118
Bad a/c to model

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	580 C TIT	140
05	39455	2067	580 C TIT	140
05	105983	10000	580 C TIT	140
05	200000	10000	580 C TIT	140

Flight Profile : 8TNA for a TRANSIENT C-130
On Flight Track 34A
modif to incl P3,L188,L382,C118 same alt/pwr profile
??

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	0
03	3000	0	970 C TIT	170
03	10000	800	970 C TIT	170
03	31000	3000	970 C TIT	170
03	163000	10000	970 C TIT	170
03	200000	10000	970 C TIT	170

Flight Profile : 8TNH for a TRANSIENT C-130
On Flight Track 34H
modif to incl P3,L188,L382,C118
Bad a/c to model

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	0
03	3000	0	970 C TIT	170
03	10000	800	970 C TIT	170
03	31000	3000	970 C TIT	170
03	163000	10000	970 C TIT	170
03	200000	10000	970 C TIT	170

Flight Profile : 8TSA for a TRANSIENT C-130
On Flight Track 16A
modif to incl P3,L188,L382,C118 same alt/pwr profile
??

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	0
03	3000	0	970 C TIT	170
03	10000	800	970 C TIT	170
03	31000	3000	970 C TIT	170
03	163000	10000	970 C TIT	170
03	200000	10000	970 C TIT	170

Flight Profile : 8TSB for a TRANSIENT C-130
On Flight Track 16B
modif to incl P3,L188,L382,C118 same alt/pwr profile
??

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	970 C TIT	170
03	3000	0	970 C TIT	170
03	10000	800	970 C TIT	170
05	31000	3000	580 C TIT	140
05	142020	3000	580 C TIT	140
05	231350	3000	580 C TIT	140

Flight Profile : 9FND for a TRANSIENT F-5A&B
On Flight Track 34D
Transient Group 3
Modif. group incl F-5,DC-8,T-38,E-3 ,flyby mods

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
04	0	2000	86 % RPM	300
04	55938	2000	86 % RPM	300

Flight Profile : 9LND for a TRANSIENT F-5A&B
On Flight Track 34D
ST8 mod

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	2000	82 % RPM	300
05	55938	50	82 % RPM	300

Flight Profile : 9LNE for a TRANSIENT F-5A&B
On Flight Track 34E
Modif. group modelled by F-5A, incl F-5,T-38,DC-8,E3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
05	0	50	82 % RPM	170
05	280000	10000	82 % RPM	170

Flight Profile : 9TNA for a TRANSIENT F-5A&B
On Flight Track 34A
Modif. group incl F-5,DC-8,T-38,E-3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	101 % RPM	0
03	2400	0	101 % RPM	150
03	10000	800	101 % RPM	250
03	12600	1000	101 % RPM	350
03	27340	2400	101 % RPM	350
03	57680	5650	101 % RPM	350
04	200000	6000	95 % RPM	300

Flight Profile : 9TSA for a TRANSIENT F-5A&B
On Flight Track 16A
Modif. group incl F-5,DC-8,T-38,E-3

POWER #	DISTANCE (FT)	ALTITUDE (FT)	POWER SETTING	AIRSPEED (KTS)
03	0	0	101 % RPM	0
03	2400	0	101 % RPM	150
03	10000	800	101 % RPM	250
03	12600	1000	101 % RPM	350
03	27340	2400	101 % RPM	350
03	57680	5650	101 % RPM	350
04	200000	6000	95 % RPM	300

FLIGHT TRACK 16E

Description: 16E on Runway 16 (ARRIVAL)
straight in arrival

Proceed 300000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-141	1LSE	ARRIVAL	0.07		0.00	0.07
BASED	C-130	4LSE	ARRIVAL	0.20		0.00	0.20
BASED	F-106	2LSE	ARRIVAL	0.27		0.00	0.27
BASED	T-33	3LSE	ARRIVAL	0.20		0.00	0.20
TRANSIENT	F-15	5LSE	ARRIVAL	0.40		0.00	0.40
TRANSIENT	C-130	8LSE	ARRIVAL	0.13		0.00	0.13
TRANSIENT	C-135A	6LSE	ARRIVAL	0.07		0.00	0.07

FLIGHT TRACK 16F

Description: 16F on Runway 34 (ARRIVAL)
turnaround and land

Proceed 4000 ft.
Turn RIGHT 180 degrees with a 3000 ft. Radius
Proceed 5000 ft.
Turn RIGHT 30 degrees with a 3000 ft. Radius
Proceed 10200 ft.
Turn LEFT 30 degrees with a 3400 ft. Radius
Proceed 270000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4FSF	ARRIVAL	0.00		0.00	0.00
BASED	C-141	1LSF	ARRIVAL	0.27		0.00	0.27

FLIGHT TRACK 34E

Description: 34E on Runway 34 (ARRIVAL)
straight in arrival

Proceed 300000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-141	1LNE	ARRIVAL	3.27		0.00	3.27
BASED	C-130	4LNE	ARRIVAL	8.47		0.00	8.47
BASED	T-33	3LNE	ARRIVAL	1.00		0.00	1.00
TRANSIENT	F-15	5LNE	ARRIVAL	0.13		0.00	0.13
TRANSIENT	C-135A	6LNE	ARRIVAL	0.40		0.00	0.40
TRANSIENT	F-5A&B	9LNE	ARRIVAL	0.60		0.00	0.60
TRANSIENT	C-9	7LNE	ARRIVAL	0.60		0.00	0.60
TRANSIENT	C-130	8LNE	ARRIVAL	1.07		0.00	1.07

===

FLIGHT TRACK 34M

Description: 34M on Runway 34 (ARRIVAL)
/4 added to account for C-141 missed approaches to 34C

Proceed 10500 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 3700 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 26600 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 3700 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 236000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-141	1MNC	ARRIVAL	1.33		0.00	1.33

===

FLIGHT TRACK 34N

Description: 34N on Runway 34 (ARRIVAL)
/4 added to account for #MND operations
moved over ST8 ~34T

Proceed 11534 ft.
Turn LEFT 215 degrees with a 3000 ft. Radius
Proceed 1944 ft.
Turn RIGHT 35 degrees with a 3000 ft. Radius
Proceed 19600 ft.
Turn LEFT 180 degrees with a 1900 ft. Radius
Proceed 248000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	F-106	2MND	ARRIVAL	1.07		0.00	1.07
BASED	T-33	3MND	ARRIVAL	1.07		0.00	1.07
TRANSIENT	F-15	5MND	ARRIVAL	0.53		0.00	0.53

FLIGHT TRACK 34O

Description:

34O on Runway 34 (ARRIVAL)
/4 added to account for 1MNGs

Proceed 4500 ft.
Turn LEFT 180 degrees with a 3400 ft. Radius
Proceed 4500 ft.
Turn LEFT 180 degrees with a 3400 ft. Radius
Proceed 270000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-141	1MNG	ARRIVAL	0.07		0.00	0.07

FLIGHT TRACK 34P

Description:

34P on Runway 34 (ARRIVAL)
/4 added to account for 1MNF

Proceed 4000 ft.
Turn RIGHT 180 degrees with a 3000 ft. Radius
Proceed 9000 ft.
Turn RIGHT 180 degrees with a 3000 ft. Radius
Proceed 269000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-141	1MNF	ARRIVAL	1.27		0.00	1.27

FLIGHT TRACK 34V

Description:

34V on Runway 34 (ARRIVAL)
Speculative TRK added to account for very unusual noise levels produced by F106 landings from unknown patterns. 2LNE ops are moved to it although ~90% seem to produce levels. True straight in approaches would have to be sc from the MCSS database.

Proceed 11541 ft.
Turn LEFT 50 degrees with a 3400 ft. Radius
Proceed 12100 ft.
Turn RIGHT 100 degrees with a 3400 ft. Radius
Proceed 270000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	F-106	2LNE	ARRIVAL	2.13		0.00	2.13

FLIGHT TRACK 16B

Description:

16B on Runway 16 (CLOSED PATTERN)
Tacoma east pattern

Proceed 34000 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 4500 ft.
Turn LEFT 50 degrees with a 3400 ft. Radius
Proceed 16420 ft.
Turn LEFT 40 degrees with a 3400 ft. Radius
Proceed 76421 ft.
Turn LEFT 180 degrees with a 10927 ft. Radius
Proceed 55000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4FSB	CLOSED	0.00		0.00	0.00
BASED	C-141	1GSB	CLOSED	0.73		0.00	0.73
BASED	C-141	1TSB	CLOSED	0.47		0.00	0.47
BASED	C-141	1FSB	CLOSED	0.40		0.00	0.40
BASED	F-106	2FSB	CLOSED	0.20		0.00	0.20
BASED	T-33	3TSB	CLOSED	0.00		0.00	0.00
BASED	T-33	3FSB	CLOSED	0.13		0.00	0.13
TRANSIENT	F-15	5TSB	CLOSED	0.13		0.00	0.13
TRANSIENT	C-9	7TSB	CLOSED	0.07		0.00	0.07
TRANSIENT	C-130	8TSB	CLOSED	0.40		0.00	0.40

FLIGHT TRACK 16C

Description: 16C on Runway 16 (CLOSED PATTERN)
LH VFR pattern (similar to 34c)

Proceed 16100 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 3700 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 28100 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 3700 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 12000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4TSC	CLOSED	0.40		0.00	0.40
BASED	C-141	1FSC	CLOSED	0.60		0.00	0.60

FLIGHT TRACK 16D

Description: 16D on Runway 16 (CLOSED PATTERN)
LH VFR closed loop (similar to 34d)

Proceed 13100 ft.
Turn LEFT 180 degrees with a 1900 ft. Radius
Proceed 22100 ft.
Turn LEFT 180 degrees with a 1900 ft. Radius
Proceed 9000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	F-106	2FSD	CLOSED	1.87		0.00	1.87
BASED	T-33	3GSD	CLOSED	0.67		0.00	0.67
BASED	F-106	2TSD	CLOSED	0.20		0.00	0.20
BASED	F-106	2LSD	CLOSED	0.67		0.00	0.67
TRANSIENT	F-15	5FSD	CLOSED	0.47		0.00	0.47
TRANSIENT	F-15	5LSD	CLOSED	0.33		0.00	0.33

FLIGHT TRACK 16G

Description: 16G on Runway 16 (CLOSED PATTERN)
LH overhead arrival

Proceed 1 ft.
Turn LEFT 180 degrees with a 3400 ft. Radius
Proceed 4500 ft.
Turn LEFT 180 degrees with a 3400 ft. Radius
Proceed 4499 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4FSG	CLOSED	0.00		0.00	0.00
BASED	F-106	2FSG	CLOSED	0.33		0.00	0.33
BASED	T-33	3FSG	CLOSED	0.20		0.00	0.20
TRANSIENT	F-15	5FSG	CLOSED	0.13		0.00	0.13

FLIGHT TRACK 16Q

Description: 16Q on Runway 16 (CLOSED PATTERN)
/4 added to account for #FSHs

Proceed 90000 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 50000 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 114300 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 50000 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 24300 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	F-106	2FSH	CLOSED	0.13		0.00	0.13

FLIGHT TRACK 34B

Description:

34B on Runway 34 (CLOSED PATTERN)
East pattern

Proceed 34000 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 4500 ft.
Turn RIGHT 70 degrees with a 3400 ft. Radius
Proceed 30861 ft.
Turn RIGHT 20 degrees with a 3400 ft. Radius
Proceed 59000 ft.
Turn RIGHT 180 degrees with a 10928 ft. Radius
Proceed 54000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4GNB	CLOSED	1.73		0.00	1.73
BASED	C-130	4TNB	CLOSED	1.27		0.00	1.27
BASED	C-130	4FNB	CLOSED	1.33		0.00	1.33
BASED	C-141	1GNB	CLOSED	11.47		0.00	11.47
BASED	C-141	1TNB	CLOSED	1.53		0.00	1.53
BASED	C-141	1FNB	CLOSED	5.07		0.00	5.07
BASED	F-106	2FNB	CLOSED	1.47		0.00	1.47
BASED	F-106	2GNB	CLOSED	0.20		0.00	0.20
BASED	T-33	3FNB	CLOSED	0.53		0.00	0.53
BASED	C-130	4LNB	CLOSED	1.00		0.00	1.00
BASED	C-141	1LNB	CLOSED	1.87		0.00	1.87
BASED	F-106	2LNB	CLOSED	0.47		0.00	0.47
TRANSIENT	F-15	5FNB	CLOSED	0.07		0.00	0.07
TRANSIENT	C-135A	6FNB	CLOSED	0.13		0.00	0.13
TRANSIENT	C-130	8GNB	CLOSED	0.33		0.00	0.33

FLIGHT TRACK 34C

Description:

34C on Runway 34 (CLOSED PATTERN)
VFR pattern (Inner east pattern)

Proceed 16100 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 3700 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 28100 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 3700 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 12000 ft.

```
*****************************************************************************
* BASEOPS 3.00                 FLIGHT TRACK SUMMARY              DATE: 12-12-90 *
* FILE NAME: MCS4                   MCCHORD AFB                       PAGE 51  *
* CASE NAME: MCS4 with final Profiles and Flight Tracks                        *
*****************************************************************************
```

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4TNC	CLOSED	1.33		0.00	1.33
BASED	C-130	4FNC	CLOSED	0.87		0.00	0.87
BASED	C-130	4GNC	CLOSED	0.87		0.00	0.87
BASED	C-141	1TNC	CLOSED	0.20		0.00	0.20
BASED	C-130	4LNC	CLOSED	2.00		0.00	2.00

===

FLIGHT TRACK 34D

Description:

34D on Runway 34 (CLOSED PATTERN)
VFR closed loop (innermost east pattern)

Proceed 13100 ft.
Turn RIGHT 180 degrees with a 1900 ft. Radius
Proceed 22000 ft.
Turn RIGHT 180 degrees with a 1900 ft. Radius
Proceed 8900 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	T-33	3GND	CLOSED	1.13		0.00	1.13
BASED	T-33	3FND	CLOSED	2.40		0.00	2.40
BASED	T-33	3LND	CLOSED	1.07		0.00	1.07
TRANSIENT	F-15	5FND	CLOSED	0.73		0.00	0.73
TRANSIENT	F-5A&B	9FND	CLOSED	0.40		0.00	0.40
TRANSIENT	C-9	7FND	CLOSED	0.07		0.00	0.07
TRANSIENT	F-5A&B	9LND	CLOSED	0.13		0.00	0.13

===

FLIGHT TRACK 34F

Description:

34F on Runway 34 (CLOSED PATTERN)
LH overhead arrival

Proceed 5000 ft.
Turn LEFT 180 degrees with a 3000 ft. Radius
Proceed 9000 ft.
Turn LEFT 180 degrees with a 3000 ft. Radius
Proceed 4000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4FNF	CLOSED	0.20		0.00	0.20
BASED	C-141	1FNF	CLOSED	2.93		0.00	2.93
BASED	F-106	2FNF	CLOSED	0.07		0.00	0.07

===

FLIGHT TRACK 34G

Description: 34G on Runway 34 (CLOSED PATTERN)
overhead arrival

Proceed 1 ft.
Turn RIGHT 180 degrees with a 3400 ft. Radius
Proceed 4500 ft.
Turn RIGHT 180 degrees with a 3400 ft. Radius
Proceed 4499 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4FNG	CLOSED	0.27		0.00	0.27
BASED	C-141	1FNG	CLOSED	0.40		0.00	0.40
BASED	F-106	2FNG	CLOSED	0.60		0.00	0.60
BASED	T-33	3FNG	CLOSED	0.47		0.00	0.47
TRANSIENT	F-15	5FNG	CLOSED	0.20		0.00	0.20

FLIGHT TRACK 34Q

Description: 34Q on Runway 34 (CLOSED PATTERN)
/4 added to account for #FNAs

Proceed 34000 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 50000 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 114300 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 50000 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 80300 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-141	1FNA	CLOSED	0.53		0.00	0.53
BASED	F-106	2FNA	CLOSED	0.33		0.00	0.33
BASED	C-141	1GNA	CLOSED	1.87		0.00	1.87
BASED	F-106	2GNA	CLOSED	0.20		0.00	0.20

===

FLIGHT TRACK 34S

Description: 34S on Runway 34 (CLOSED PATTERN)
VFR pattern (Inner east pattern)
/4 modified to match data at STs 7&8

Proceed 16100 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 3700 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 26600 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 3700 ft.
Turn RIGHT 90 degrees with a 3400 ft. Radius
Proceed 10500 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-141	1GNC	CLOSED	2.67		0.00	2.67
BASED	C-141	1FNC	CLOSED	0.93		0.00	0.93

===

FLIGHT TRACK 34T

Description: 34T on Runway 34 (CLOSED PATTERN)
mod. VFR pattern w/ HS turn at S end

Proceed 13100 ft.
Turn RIGHT 180 degrees with a 1900 ft. Radius
Proceed 19600 ft.
Turn LEFT 35 degrees with a 3000 ft. Radius
Proceed 1944 ft.
Turn RIGHT 215 degrees with a 3000 ft. Radius
Proceed 11534 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	F-106	2GND	CLOSED	0.60		0.00	0.60
BASED	F-106	2LND	CLOSED	2.13		0.00	2.13
TRANSIENT	F-15	5LND	CLOSED	0.73		0.00	0.73

===

```
================================================================================
                              FLIGHT TRACK 34U

Description:            34U on Runway 34 (CLOSED PATTERN)
                        VFR pattern (Inner east pattern)
                        /4 modified to match data at STs 7&8 4th est

                        Proceed 16100 ft.
                        Turn RIGHT  90 degrees with a 3400 ft. Radius
                        Proceed 3700 ft.
                        Turn RIGHT  90 degrees with a 3400 ft. Radius
                        Proceed 25600 ft.
                        Turn RIGHT  90 degrees with a 3400 ft. Radius
                        Proceed 3700 ft.
                        Turn RIGHT  90 degrees with a 3400 ft. Radius
                        Proceed 9500 ft.
                        -------------------------------------------------------

A/C TYPE   AIRCRAFT    POWER      OPERATION    NUMBER OF DAILY OPERATIONS
                       PROFILE ID   TYPE       DAY      EVE     NIGHT   TOTAL

BASED      C-141        1LNC      CLOSED       1.27              0.00    1.27

================================================================================
                              FLIGHT TRACK 34W

Description:            34W on Runway 34 (CLOSED PATTERN)
                        2nd mod. VFR pattern w/ HS turn at S end

                        Proceed 13100 ft.
                        Turn RIGHT 180 degrees with a 1900 ft. Radius
                        Proceed 18800 ft.
                        Turn LEFT  55 degrees with a 3300 ft. Radius
                        Proceed 558 ft.
                        Turn RIGHT 235 degrees with a 3600 ft. Radius
                        Proceed 11672 ft.
                        -------------------------------------------------------

A/C TYPE   AIRCRAFT    POWER      OPERATION    NUMBER OF DAILY OPERATIONS
                       PROFILE ID   TYPE       DAY      EVE     NIGHT   TOTAL

BASED      F-106        2FND      CLOSED       4.00              0.00    4.00

================================================================================
                              FLIGHT TRACK 16A

Description:            16A on Runway 16 (DEPARTURE)
                        std instr departure

                        Proceed 34000 ft.
                        Turn RIGHT  90 degrees with a 3400 ft. Radius
                        Proceed 261000 ft.
                        -------------------------------------------------------
```

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-141	1TSA	DEPARTURE	0.73		0.00	0.73
BASED	F-106	2TSA	DEPARTURE	0.33		0.00	0.33
BASED	C-130	4TSA	DEPARTURE	0.53		0.00	0.53
TRANSIENT	F-5A&B	9TSA	DEPARTURE	0.07		0.00	0.07
TRANSIENT	C-9	7TSA	DEPARTURE	0.13		0.00	0.13
TRANSIENT	C-130	8TSA	DEPARTURE	0.33		0.00	0.33

FLIGHT TRACK 16H

Description: 16H on Runway 16 (DEPARTURE)
straight ou departure

Proceed 300000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4TSH	DEPARTURE	0.53		0.00	0.53
BASED	C-141	1TSH	DEPARTURE	0.53		0.00	0.53
BASED	T-33	3TSH	DEPARTURE	0.27		0.00	0.27
BASED	F-106	2TSH	DEPARTURE	0.20		0.00	0.20
TRANSIENT	C-135A	6TSH	DEPARTURE	0.07		0.00	0.07
TRANSIENT	F-15	5TSH	DEPARTURE	0.07		0.00	0.07
TRANSIENT	C-9	7TSH	DEPARTURE	0.13		0.00	0.13

FLIGHT TRACK 34A

Description: 34A on Runway 34 (DEPARTURE)
LH 90deg departure

Proceed 34000 ft.
Turn LEFT 90 degrees with a 3400 ft. Radius
Proceed 270000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4GNA	DEPARTURE	0.27		0.00	0.27
BASED	C-130	4TNA	DEPARTURE	4.00		0.00	4.00
BASED	C-130	4FNA	DEPARTURE	0.13		0.00	0.13
BASED	C-141	1TNA	DEPARTURE	4.47		0.00	4.47
BASED	F-106	2TNA	DEPARTURE	5.60		0.00	5.60
BASED	T-33	3TNA	DEPARTURE	2.67		0.00	2.67
TRANSIENT	F-15	5TNA	DEPARTURE	1.47		0.00	1.47
TRANSIENT	C-135A	6TNA	DEPARTURE	0.27		0.00	0.27
TRANSIENT	F-5A&B	9TNA	DEPARTURE	0.20		0.00	0.20
TRANSIENT	C-9	7TNA	DEPARTURE	0.33		0.00	0.33

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
TRANSIENT	C-130	8TNA	DEPARTURE	0.20		0.00	0.20

FLIGHT TRACK 34H

Description: 34H on Runway 34 (DEPARTURE)
straight out departure

Proceed 300000 ft.

A/C TYPE	AIRCRAFT	POWER PROFILE ID	OPERATION TYPE	NUMBER OF DAILY OPERATIONS DAY	EVE	NIGHT	TOTAL
BASED	C-130	4TNH	DEPARTURE	0.20		0.00	0.20
BASED	C-141	1TNH	DEPARTURE	0.07		0.00	0.07
BASED	F-106	2TNH	DEPARTURE	0.13		0.00	0.13
BASED	T-33	3FNH	DEPARTURE	0.13		0.00	0.13
TRANSIENT	C-130	8TNH	DEPARTURE	0.07		0.00	0.07

AIRCRAFT	PAD ID	RUNUP ID	POWER SETTING	MINUTES AT POWER DAY	EVE	NIGHT	TOTAL
C-130E	C12	C12	1400 IN-LBS	0.2		0.0	0.2
C-130E	C13	C13	1400 IN-LBS	0.1		0.0	0.1
C-130E	C9	C9	1400 IN-LBS	0.1		0.0	0.1
C-130 RU on unknown pads were distributed evenly							
C-130E	D25	D25E	1400 IN-LBS	0.7		0.0	0.7
C-130E	D26	D26E	1400 IN-LBS	0.2		0.0	0.2
C-130E	D29	D29E	1400 IN-LBS	0.2		0.0	0.2
C-130E	D31	D31E	1400 IN-LBS	0.1		0.0	0.1
C-130E	D32	D32	9600 IN-LBS	0.2		0.0	0.2
C-130E	E1	E1	1400 IN-LBS	0.2		0.0	0.2
C-130E	J7	J7	1400 IN-LBS	0.1		0.0	0.1
C-135B SUBBED FOR DC-8							
C-135B	J5	J5	100 % RPM	0.1		0.0	0.1
C-141A	B5	B5	70 % NF	0.3		0.0	0.3
C-141A	D25	D25A	70 % NF	0.1		0.0	0.1
C-141A	D26	D26A	70 % NF	0.3		0.0	0.3
C-141A	D27	D27A	95 % NF	0.2		0.0	0.2

AIRCRAFT	PAD ID	RUNUP ID	POWER SETTING	MINUTES AT POWER DAY	EVE	NIGHT	TOTAL
C-141A	D28	D28A	70 % NF	0.4		0.0	0.4
C-141A	D29	D29A	95 % NF	0.5		0.0	0.5
INCL 2 CV99 C-141A	D31	D31A	70 % NF	0.4		0.0	0.4
C-141A	J12	J12	70 % NF	0.4		0.0	0.4
C-141A	J9	J9	70 % NF	0.1		0.0	0.1
F-106	E12	E12	100 % RPM	0.3		0.0	0.3
F-106	E8	E8	100 % RPM	0.1		0.0	0.1

```
=============================================================================
                                 RUNUP PAD B5

LOCATION     :        47 Degrees  8 Minutes  53.3 Seconds North Latitude
                     122 Degrees 28 Minutes  54.7 Seconds West Longitude
                     (X = 98323 , Y = 209799 )

ORIENTATION :        200 Degrees from Magnetic North
                     --------------------------------------------------------

AIRCRAFT                    PROFILE ID                TOTAL TIME IN MINUTES
  C-141A                        B5                                  0.3

=============================================================================
                                RUNUP PAD C12

LOCATION     :        47 Degrees  8 Minutes  29.8 Seconds North Latitude
                     122 Degrees 29 Minutes  19.4 Seconds West Longitude
                     (X = 96623 , Y = 207419 )

ORIENTATION :        160 Degrees from Magnetic North
                     --------------------------------------------------------

AIRCRAFT                    PROFILE ID                TOTAL TIME IN MINUTES
  C-130E                        C12                                 0.2

=============================================================================
                                RUNUP PAD C13

LOCATION     :        47 Degrees  8 Minutes  29.8 Seconds North Latitude
                     122 Degrees 29 Minutes  15.7 Seconds West Longitude
                     (X = 96873 , Y = 207419 )

ORIENTATION :        160 Degrees from Magnetic North
                     --------------------------------------------------------

AIRCRAFT                    PROFILE ID                TOTAL TIME IN MINUTES
  C-130E                        C13                                 0.1

=============================================================================
                                 RUNUP PAD C9

LOCATION     :        47 Degrees  8 Minutes  33.6 Seconds North Latitude
                     122 Degrees 29 Minutes  20.1 Seconds West Longitude
                     (X = 96575 , Y = 207799 )

ORIENTATION :        160 Degrees from Magnetic North
                     --------------------------------------------------------

AIRCRAFT                    PROFILE ID                TOTAL TIME IN MINUTES
  C-130E                        C9                                  0.1

=============================================================================
```

```
===============================================================================
                               RUNUP PAD D25

LOCATION    :         47 Degrees  8 Minutes  13.0 Seconds North Latitude
                     122 Degrees 29 Minutes   0.5 Seconds West Longitude
                     (X = 97926 , Y = 205710 )

ORIENTATION :        190 Degrees from Magnetic North
                     ----------------------------------------------------------

AIRCRAFT                    PROFILE ID                TOTAL TIME IN MINUTES
  C-130E                       D25E                                0.7
  C-141A                       D25A                                0.1

===============================================================================
                               RUNUP PAD D26

LOCATION    :         47 Degrees  8 Minutes  12.3 Seconds North Latitude
                     122 Degrees 28 Minutes  58.1 Seconds West Longitude
                     (X = 98086 , Y = 205639 )

ORIENTATION :        190 Degrees from Magnetic North
                     ----------------------------------------------------------

AIRCRAFT                    PROFILE ID                TOTAL TIME IN MINUTES
  C-130E                       D26E                                0.2
  C-141A                       D26A                                0.3

===============================================================================
                               RUNUP PAD D27

LOCATION    :         47 Degrees  8 Minutes  11.6 Seconds North Latitude
                     122 Degrees 28 Minutes  55.8 Seconds West Longitude
                     (X = 98246 , Y = 205569 )

ORIENTATION :        190 Degrees from Magnetic North
                     ----------------------------------------------------------

AIRCRAFT                    PROFILE ID                TOTAL TIME IN MINUTES
  C-141A                       D27A                                0.2

===============================================================================
                               RUNUP PAD D28

LOCATION    :         47 Degrees  8 Minutes  10.9 Seconds North Latitude
                     122 Degrees 28 Minutes  53.5 Seconds West Longitude
                     (X = 98406 , Y = 205499 )

ORIENTATION :        190 Degrees from Magnetic North
                     ----------------------------------------------------------

AIRCRAFT                    PROFILE ID                TOTAL TIME IN MINUTES
  C-141A                       D28A                                0.4

===============================================================================
```

RUNUP PAD D29

LOCATION : 47 Degrees 8 Minutes 10.2 Seconds North Latitude
122 Degrees 28 Minutes 51.2 Seconds West Longitude
(X = 98566 , Y = 205429)

ORIENTATION : 190 Degrees from Magnetic North

AIRCRAFT	PROFILE ID	TOTAL TIME IN MINUTES
C-130E	D29E	0.2
C-141A	D29A	0.5

RUNUP PAD D31

LOCATION : 47 Degrees 8 Minutes 8.8 Seconds North Latitude
122 Degrees 28 Minutes 46.5 Seconds West Longitude
(X = 98886 , Y = 205289)

ORIENTATION : 190 Degrees from Magnetic North

AIRCRAFT	PROFILE ID	TOTAL TIME IN MINUTES
C-130E	D31E	0.1
C-141A	D31A	0.4

RUNUP PAD D32

LOCATION : 47 Degrees 8 Minutes 8.1 Seconds North Latitude
122 Degrees 28 Minutes 44.2 Seconds West Longitude
(X = 99046 , Y = 205220)

ORIENTATION : 190 Degrees from Magnetic North

AIRCRAFT	PROFILE ID	TOTAL TIME IN MINUTES
C-130E	D32	0.2

RUNUP PAD E1

LOCATION : 47 Degrees 7 Minutes 23.5 Seconds North Latitude
122 Degrees 28 Minutes 47.1 Seconds West Longitude
(X = 98845 , Y = 200700)

ORIENTATION : 90 Degrees from Magnetic North

AIRCRAFT	PROFILE ID	TOTAL TIME IN MINUTES
C-130E	E1	0.2

```
==============================================================================
                              RUNUP PAD E12

LOCATION     :      47 Degrees  7 Minutes  34.4 Seconds North Latitude
                   122 Degrees 28 Minutes  47.1 Seconds West Longitude
                   (X = 98845 , Y = 201800 )

ORIENTATION :       90 Degrees from Magnetic North
                   ---------------------------------------------------------

AIRCRAFT                   PROFILE ID                TOTAL TIME IN MINUTES
  F-106                       E12                                0.3

==============================================================================
                               RUNUP PAD E8

LOCATION     :      47 Degrees  7 Minutes  30.4 Seconds North Latitude
                   122 Degrees 28 Minutes  47.1 Seconds West Longitude
                   (X = 98845 , Y = 201400 )

ORIENTATION :       90 Degrees from Magnetic North
                   ---------------------------------------------------------

AIRCRAFT                   PROFILE ID                TOTAL TIME IN MINUTES
  F-106                       E8                                 0.1

==============================================================================
                              RUNUP PAD J12

LOCATION     :      47 Degrees  8 Minutes  35.6 Seconds North Latitude
                   122 Degrees 28 Minutes  50.2 Seconds West Longitude
                   (X = 98635 , Y = 207999 )

ORIENTATION :      200 Degrees from Magnetic North
                   ---------------------------------------------------------

AIRCRAFT                   PROFILE ID                TOTAL TIME IN MINUTES
  C-141A                      J12                                0.4

==============================================================================
                               RUNUP PAD J5

LOCATION     :      47 Degrees  8 Minutes  42.7 Seconds North Latitude
                   122 Degrees 28 Minutes  40.2 Seconds West Longitude
                   (X = 99323 , Y = 208723 )

ORIENTATION :      200 Degrees from Magnetic North
                   ---------------------------------------------------------

AIRCRAFT                   PROFILE ID                TOTAL TIME IN MINUTES
  C-135B                      J5                                 0.1

==============================================================================
```

```
=============================================================================
                               RUNUP PAD J7

LOCATION     :       47 Degrees  8 Minutes  38.7 Seconds North Latitude
                    122 Degrees 28 Minutes  56.0 Seconds West Longitude
                    (X = 98235 , Y = 208319 )

ORIENTATION :       200 Degrees from Magnetic North
                    ---------------------------------------------------------

AIRCRAFT                   PROFILE ID                 TOTAL TIME IN MINUTES
  C-130E                      J7                                  0.1

=============================================================================
                               RUNUP PAD J9

LOCATION     :       47 Degrees  8 Minutes  38.7 Seconds North Latitude
                    122 Degrees 28 Minutes  50.2 Seconds West Longitude
                    (X = 98635 , Y = 208319 )

ORIENTATION :       200 Degrees from Magnetic North
                    ---------------------------------------------------------

AIRCRAFT                   PROFILE ID                 TOTAL TIME IN MINUTES
  C-141A                      J9                                  0.1

=============================================================================
```

APPENDIX D: THE McCHORD AFB SENSITIVITY STUDY DATABASE

Definition of the Database Structure

DATABASE DESCRIPTION: McChord Sensitivity Study
DEFAULT INPUT FORM:
DEFAULT REPORT FORM: SUMMARY

FIELD: DATE METHOD: Detailed SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Other Date
MIN LENGTH: 8 MAX LENGTH: 8 DECIMALS:
REPORT PICTURE: DD
REPORT HEADING: Day

FIELD: CALL_SIGN METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 9 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: OP METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 3 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: RW_P METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 4 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: TRK METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 3 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: O_ALT METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: O_T METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Integer
MIN LENGTH: 0 MAX LENGTH: 6 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

MCSS DATABASE DEFINITION

FIELD: AIR_C METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: AC METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 1 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: RWT METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 2 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: OPGRP METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 4 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: S1_T METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Integer
MIN LENGTH: 0 MAX LENGTH: 7 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: S1_ALM METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Decimal
MIN LENGTH: 0 MAX LENGTH: 6 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:

FIELD: S1_DUR METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Decimal
MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:

FIELD: S1_SEL METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Decimal
MIN LENGTH: 0 MAX LENGTH: 6 DECIMALS: 1

MCSS DATABASE DEFINITION

REPORT PICTURE:
REPORT HEADING:

FIELD: Y1 METHOD: Quick SOURCE: Keyboard

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Logical		Y	

MIN LENGTH: 1 MAX LENGTH: 1 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: COMMENT METHOD: Quick SOURCE: Keyboard

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Text			

MIN LENGTH: 0 MAX LENGTH: 10 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: N1 METHOD: Detailed SOURCE: Derived

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Numeric	Integer		

MIN LENGTH: 0 MAX LENGTH: 3 DECIMALS: 0
REPORT PICTURE:
REPORT HEADING:
FORMULA

```
 @IF(((O_T>080000 and O_T<200000) or (S1_T>080000 and
S1_T<200000)) and (Y1 or (not y1 and AC="X" and
S1_SEL<90)),1,0)
```

FIELD: S8_T METHOD: Quick SOURCE: Keyboard

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Integer			

MIN LENGTH: 0 MAX LENGTH: 6 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: S8_ALM METHOD: Quick SOURCE: Keyboard

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Decimal			

MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:

FIELD: S8_DUR METHOD: Quick SOURCE: Keyboard

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Decimal			

MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:

FIELD: S8_SEL METHOD: Quick SOURCE: Keyboard

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Decimal			

MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS: 1

MCSS DATABASE DEFINITION

REPORT PICTURE:
REPORT HEADING:

FIELD: Y8 METHOD: Quick SOURCE: Keyboard

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Logical		Y	

MIN LENGTH: 1 MAX LENGTH: 1 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: COMMENT8 METHOD: Quick SOURCE: Keyboard

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Text			

MIN LENGTH: 0 MAX LENGTH: 10 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: N8 METHOD: Detailed SOURCE: Derived

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Numeric	Integer		

MIN LENGTH: 0 MAX LENGTH: 3 DECIMALS: 0
REPORT PICTURE:
REPORT HEADING:
FORMULA

```
@IF(((O_T>080000 and O_T<200000) or (S8_T>080000 and
S8_T<200000)) and (Y8 or (not y8 and AC="X" and
S8_SEL<80)),1,0)
```

FIELD: S1SELC METHOD: Detailed SOURCE: Derived

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Numeric	Decimal		

MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:
FORMULA

```
@IF(COMMENT="PAIR+2$",S1_SEL-6,@IF(COMMENT="PAIR+1$",
S1_SEL-4.8,@IF(COMMENT="PAIR$",S1_SEL-3,S1_SEL)))
```

FIELD: S1SELX METHOD: Detailed SOURCE: Derived

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Numeric	Integer		

MIN LENGTH: 0 MAX LENGTH: 9 DECIMALS: 0
REPORT PICTURE:
REPORT HEADING: Energy
FORMULA

```
@IF(N1<>0,@EXP10(S1SELC/10-5))
```

FIELD: S1SELX2 METHOD: Detailed SOURCE: Derived

DATA TYPE	NUMERIC TYPE	LOGICAL TYPE	OTHER TYPE
Numeric			

MIN LENGTH: 0 MAX LENGTH: 14 DECIMALS: 0
REPORT PICTURE:
REPORT HEADING: Std Dev

FORMULA
@IF(N1<>0,S1SELX**2/100)

FIELD: **S8SELC** METHOD: Detailed SOURCE: Derived
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Numeric Decimal
MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:
FORMULA
@IF(COMMENT8="PAIR+2$",S8_SEL-6,@IF(COMMENT8="PAIR+1$"
S8_SEL-4.3,@IF(COMMENT8="PAIR$",S8_SEL-3,S8_SEL)))

FIELD: **S8SELX** METHOD: Detailed SOURCE: Derived
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Numeric Integer
MIN LENGTH: 0 MAX LENGTH: 9 DECIMALS: 0
REPORT PICTURE:
REPORT HEADING: Energy
FORMULA
@IF(N8<>0,@EXP10(S8SELC/10-5))

FIELD: **S8SELX2** METHOD: Detailed SOURCE: Derived
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Numeric
MIN LENGTH: 0 MAX LENGTH: 14 DECIMALS: 0
REPORT PICTURE:
REPORT HEADING: Std Dev
FORMULA
@IF(N8<>0,S8SELX**2/100)

FIELD: **O** METHOD: Detailed SOURCE: Derived
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 1 DECIMALS:
REPORT PICTURE:
REPORT HEADING:
FORMULA
@IF(OP=" L ","L",@IF(OP=" TO","T",@IF(OP="
FB","F",@IF(OP=" TG","G",@IF(OP=" MA","M",@IF(OP="
RU","R"))))))

FIELD: **AORT** METHOD: Detailed SOURCE: Derived
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: MAX LENGTH: 4 DECIMALS:
REPORT PICTURE:
REPORT HEADING:
FORMULA
(AC)&(O)&(RWT)

FIELD: **S7_T** METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE

Integer
MIN LENGTH: 0 MAX LENGTH: 7 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: S7_ALM METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Decimal
MIN LENGTH: 0 MAX LENGTH: 6 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:

FIELD: S7_DUR METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Decimal
MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:

FIELD: S7_SEL METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Decimal
MIN LENGTH: 0 MAX LENGTH: 6 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:

FIELD: Y7 METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Logical Y
MIN LENGTH: 1 MAX LENGTH: 1 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: N7 METHOD: Detailed SOURCE: Derived
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Numeric Integer
MIN LENGTH: 0 MAX LENGTH: 3 DECIMALS: 0
REPORT PICTURE:
REPORT HEADING:
FORMULA
@IF(((O_T>080000 and O_T<200000) or (S7_T>080000 and S7_T<200000)) and (Y7 or (not y7 and AC="X" and S7_SEL<80)),1,0)

FIELD: COMMENT7 METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Text
MIN LENGTH: 0 MAX LENGTH: 10 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: S7SELC METHOD: Detailed SOURCE: Derived
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE

Numeric Decimal
MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:
FORMULA
@IF(COMMENT7="PAIR+2$",S7_SEL-6,@IF(COMMENT7="PAIR+1$",
S7_SEL-4.8,@IF(COMMENT7="PAIR$",S7_SEL-3,S7_SEL)))

FIELD: S7SELX METHOD: Detailed SOURCE: Derived
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Numeric Integer
MIN LENGTH: 0 MAX LENGTH: 9 DECIMALS: 0
REPORT PICTURE:
REPORT HEADING: Energy
FORMULA
@IF(N7<>0,@EXP10(S7SELC/10-5))

FIELD: S7SELX2 METHOD: Detailed SOURCE: Derived
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Numeric
MIN LENGTH: 0 MAX LENGTH: 14 DECIMALS: 0
REPORT PICTURE:
REPORT HEADING: Std Dev
FORMULA
@IF(N7<>0,S7SELX**2/100)

FIELD: S9_T METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Integer
MIN LENGTH: 0 MAX LENGTH: 7 DECIMALS:
REPORT PICTURE:
REPORT HEADING:

FIELD: S9_ALM METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Decimal
MIN LENGTH: 0 MAX LENGTH: 6 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:

FIELD: S9_DUR METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Decimal
MIN LENGTH: 0 MAX LENGTH: 5 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:

FIELD: S9_SEL METHOD: Quick SOURCE: Keyboard
DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE
Decimal
MIN LENGTH: 0 MAX LENGTH: 6 DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:

MCSS DATABASE DEFINITION

```
-----------------------------------------------------------------
FIELD: Y9              METHOD: Quick       SOURCE:  Keyboard
DATA TYPE   NUMERIC TYPE   LOGICAL TYPE   OTHER TYPE
Logical                    Y
MIN LENGTH: 1  MAX LENGTH: 1  DECIMALS:
REPORT PICTURE:
REPORT HEADING:
-----------------------------------------------------------------
FIELD: N9              METHOD: Detailed    SOURCE:  Derived
DATA TYPE   NUMERIC TYPE   LOGICAL TYPE   OTHER TYPE
Numeric     Integer
MIN LENGTH: 0  MAX LENGTH: 3  DECIMALS: 0
REPORT PICTURE:
REPORT HEADING:
FORMULA
 @IF(((O_T>080000 and O_T<200000) or (S9_T>080000 and
S9_T<200000)) and (Y9 or (not y9 and AC="X" and
S9_SEL<80)),1,0)
-----------------------------------------------------------------
FIELD: COMMENT9        METHOD: Quick       SOURCE:  Keyboard
DATA TYPE   NUMERIC TYPE   LOGICAL TYPE   OTHER TYPE
Text
MIN LENGTH: 0  MAX LENGTH: 10  DECIMALS:
REPORT PICTURE:
REPORT HEADING:
-----------------------------------------------------------------
FIELD: S9SELC          METHOD: Detailed    SOURCE:  Derived
DATA TYPE   NUMERIC TYPE   LOGICAL TYPE   OTHER TYPE
Numeric     Decimal
MIN LENGTH: 0  MAX LENGTH: 5  DECIMALS: 1
REPORT PICTURE:
REPORT HEADING:
FORMULA
 @IF(COMMENT9="PAIR+2$".S9_SEL-6,@IF(COMMENT9="PAIR+1$",
S9_SEL-4.8,@IF(COMMENT9="PAIR$",S9_SEL-3,S9_SEL)))
-----------------------------------------------------------------
FIELD: S9SELX          METHOD: Detailed    SOURCE:  Derived
DATA TYPE   NUMERIC TYPE   LOGICAL TYPE   OTHER TYPE
Numeric     Integer
MIN LENGTH: 0  MAX LENGTH: 9  DECIMALS: 0
REPORT PICTURE:
REPORT HEADING: Energy
FORMULA
 @IF(N9<>0,@EXP10(S9SELC/10-5))
-----------------------------------------------------------------
FIELD: S9SELX2         METHOD: Detailed    SOURCE:  Derived
DATA TYPE   NUMERIC TYPE   LOGICAL TYPE   OTHER TYPE
Numeric
MIN LENGTH: 0  MAX LENGTH: 14  DECIMALS: 0
REPORT PICTURE:
REPORT HEADING: Std Dev
FORMULA
 @IF(N9<>0,S9SELX**2/100)
```

MCSS DATABASE DEFINITION

FIELD: **RECORD** METHOD: Detailed SOURCE: Keyboard

DATA TYPE NUMERIC TYPE LOGICAL TYPE OTHER TYPE

Integer

MIN LENGTH: 0 MAX LENGTH: 4 DECIMALS:

REPORT PICTURE:

REPORT HEADING:

****

REAL FIELDS: 36 TOTAL FIELDS: 54

REAL LENGTH: 192 TOTAL LENGTH: 321

Operations Log and Measured Data Summary

The following is a complete listing of all the logged operational and measured noise data from the limited time frame used in this study. All revisions of AORT codes and correlations of measured noise data are included. The columns headed "#" are derived using the SUMMARY.$RF report format associated with the database. They represent both the "Y#" logical field and PAIR comments within the "COMMENT#" text field. All other supplementary and archival fields cannot be tabulated here due to space limitations.

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
11	80400	UR	Y	0.0	0	N	0.0	0	Y	0.0	0	N	0.0	0
11	82225	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
11	83000	4TNA	Y	96.0	82955	Y	0.0	0	Y	0.0	0	N	0.0	0
11	83110	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
11	83905	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
11	84200	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
11	84200	4TNA	Y	94.8	84222	Y	0.0	0	Y	0.0	0	N	0.0	0
11	85300	4TNA	Y	99.0	85238	Y	0.0	0	Y	0.0	0	N	0.0	0
11	85300	4TNA	Y	99.9	85305	Y	0.0	0	Y	0.0	0	N	0.0	0
11	85300	4TNA	Pr	98.0	85335	Y	0.0	0	Y	0.0	0	N	0.0	0
11	85300	4TNA	Pr	98.0	85335	Y	0.0	0	Y	0.0	0	N	0.0	0
11	85900	1TNA	Y	103.2	85858	Y	0.0	0	Y	0.0	0	N	0.0	0
11	90825	4TNA	Y	100.6	90820	Y	0.0	0	Y	0.0	0	N	0.0	0
11	92915	1TNA	Y	108.1	92917	Y	0.0	0	Y	0.0	0	N	0.0	0
11	93540	1LNE	Y	0.0	0	Y	81.6	93417	Y	0.0	0	N	0.0	0
11	94625	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
11	0	X	N	79.9	95234	N	0.0	0	N	0.0	0	N	0.0	0
11	0	X	N	76.1	95305	N	0.0	0	N	0.0	0	N	0.0	0
11	102125	1TNA	Y	100.3	102137	Y	0.0	0	Y	0.0	0	N	0.0	0
11	104130	9LNE	Y	0.0	0	Y	81.7	104015	Y	0.0	0	N	0.0	0
11	104430	3TNA	Y	106.3	104430	Y	0.0	0	Y	0.0	0	N	0.0	0
11	104510	3TNA	Y	103.0	104459	Y	0.0	0	Y	0.0	0	N	0.0	0
11	104800	3TNA	Y	104.4	104801	Y	0.0	0	Y	0.0	0	N	0.0	0
11	105615	1TNA	Y	107.2	105619	Y	0.0	0	Y	0.0	0	N	0.0	0
11	111730	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
11	112355	1TNA	Y	103.5	112359	Y	0.0	0	Y	0.0	0	N	0.0	0
11	112800	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
11	112830	4TNA	Y	98.4	112830	Y	0.0	0	Y	0.0	0	N	0.0	0
11	115300	2TNA	Pr	117.6	115246	Y	0.0	0	Y	0.0	0	N	0.0	0
11	115320	2TNA	Pr	117.6	115246	Y	0.0	0	Y	0.0	0	N	0.0	0
11	115510	1TNA	Y	106.2	115513	Y	0.0	0	Y	0.0	0	N	0.0	0
11	115700	9TNA	Y	103.5	115658	Y	0.0	0	Y	0.0	0	N	0.0	0
11	120450	1TNA	Y	104.4	120453	Y	0.0	0	Y	0.0	0	N	0.0	0
11	121350	4FNA	Y	86.7	121342	Y	0.0	0	Y	0.0	0	N	0.0	0
11	122430	1GNB	Y	110.1	122445	Y	84.4	122312	Y	0.0	0	N	0.0	0
11	122840	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
11	123610	1GNA	Y	110.0	123630	Y	84.2	123504	Y	0.0	0	N	0.0	0
11	123910	1LNE	Y	0.0	0	Y	85.4	123749	Y	0.0	0	N	0.0	0
11	124115	2TNA	Pr	118.1	124120	Y	0.0	0	Y	0.0	0	N	0.0	0
11	124135	2TNA	Pr	118.1	124120	Y	0.0	0	Y	0.0	0	N	0.0	0
11	124325	4GNB	Y	94.4	124329	Y	72.4	124155	Y	0.0	0	N	0.0	0
11	125600	4LNB	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
11	132145	2TNA	Y	113.9	132137	Y	0.0	0	Y	90.0	131515	N	0.0	0
11	133530	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
11	134020	1FNF	Y	0.0	0	Y	83.0	134002	Y	0.0	0	N	0.0	0
11	134415	1GNA	Y	109.3	134431	Y	0.0	0	Y	0.0	0	N	0.0	0
11	134600	4LNE	Pr	88.4	134712	Y	0.0	0	Y	0.0	0	N	0.0	0
11	134635	4LNE	Pr	88.4	134712	Y	0.0	0	Y	0.0	0	N	0.0	0
11	141130	1GNB	Y	107.3	141131	Y	85.3	130955	Y	0.0	0	N	0.0	0
11	141740	2FNB	Pr	101.8	141731	Pr	92.6	141703	Y	88.5	141711	N	0.0	0
11	141740	2FNB	Pr	101.8	141731	Pr	92.6	141703	Y	80.7	141807	N	0.0	0
11	142310	1GNA	Y	105.4	142325	Y	84.3	142152	Y	0.0	0	N	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
11	142625	2FNB	Pr	104.1	142617	Pr	87.3	142539	Pr	87.8	142557	N	0.0	0
11	142625	2FNB	Pr	104.1	142617	Pr	87.3	142539	Pr	87.8	142557	N	0.0	0
11	143415	2TNA	Y	114.9	143357	Y	81.9	143309	Y	89.3	143427	N	0.0	0
11	143525	2TNA	Y	118.4	143510	Y	82.3	143425	Y	92.3	143536	N	0.0	0
11	143900	2LNB	Y	0.0	0	Y	87.0	143817	Y	84.9	143824	N	0.0	0
11	144045	2LNB	Y	0.0	0	Y	84.0	143954	Y	83.9	144005	N	0.0	0
11	150700	4TNA	Y	93.4	150703	Y	0.0	0	Y	76.2	150816	N	0.0	0
11	151210	1FNF	Y	0.0	0	Y	81.6	151111	Y	10.3	151118	N	0.0	0
11	151515	1GNB	Y	106.1	151532	Y	74.1	151559	Y	0.0	0	N	0.0	0
11	152100	4GNB	Y	97.7	152112	Y	70.7	151943	Y	0.0	0	N	0.0	0
11	152750	1FNF	Y	0.0	0	Y	81.1	152727	Y	70.8	152913	N	0.0	0
11	153100	1FNB	Y	92.1	153104	Y	78.7	153108	Y	86.6	153116	N	0.0	0
11	153615	4GNB	Y	97.2	153633	Y	0.0	0	Y	0.0	0	N	0.0	0
11	154520	1GNB	Y	106.5	154545	Y	81.5	154413	Y	0.0	0	N	0.0	0
11	154800	3GNB	Y	102.9	154836	Y	76.0	154723	Y	0.0	0	N	0.0	0
11	155100	4FNC	Y	92.3	155117	Y	80.1	155000	Y	78.5	155501	N	0.0	0
11	155630	4LNC	Y	86.5	155656	Y	87.2	155500	Y	76.2	155713	N	0.0	0
11	155850	2TND	Y	96.6	155759	Y	88.3	155649	Y	93.9	155819	N	0.0	0
11	160125	1LNB	Y	0.0	0	Y	83.9	155819	Y	83.4	160130	N	0.0	0
11	160230	2GND	Y	114.4	160209	Y	81.3	160121	Y	83.2	160259	N	0.0	0
11	160425	3LNB	Y	0.0	0	Y	81.2	160257	Y	88.0	160452	N	0.0	0
11	160540	2LND	Y	0.0	0	Y	92.3	160442	Y	82.1	160515	N	0.0	0
11	160710	1LNE	Y	0.0	0	Y	83.4	160533	Y	74.6	160748	N	0.0	0
11	160740	2FND	Pr	81.5	160738	Pr	81.8	160729	Pr	73.6	160926	N	0.0	0
11	160740	2FND	Pr	81.5	160738	Pr	81.8	160729	Pr	73.6	160926	N	0.0	0
11	160900	2LND	Y	0.0	0	Pr	86.2	160842	Pr	86.2	160851	N	0.0	0
11	160915	2LND	Y	0.0	0	Pr	86.2	160842	Pr	86.2	160851	N	0.0	0
11	161120	4TNB	Y	99.7	161116	Y	0.0	0	Y	0.0	0	N	0.0	0
11	162345	4GNB	Y	97.6	162351	Y	0.0	0	Y	0.0	0	N	0.0	0
11	162710	2FNB	Pr	96.8	162653	Pr	93.3	162621	Pr	92.0	162635	N	0.0	0
11	162710	2FNB	Pr	96.8	162653	Pr	93.3	162621	Pr	92.0	162635	N	0.0	0
11	162940	1LNE	Y	0.0	0	Y	80.7	162817	Y	0.0	0	N	0.0	0
11	163640	2LNB	Y	0.0	0	Pr	90.9	163548	Pr	88.2	163559	N	0.0	0
11	163640	2LNB	Y	0.0	0	Pr	90.9	163548	Pr	88.2	163559	N	0.0	0
11	164036	4GNB	Y	96.2	164051	Y	0.0	0	Y	0.0	0	N	0.0	0
11	165430	4LNB	Y	0.0	0	Y	75.9	165257	Y	0.0	0	N	0.0	0
11	165520	4TNB	Y	101.3	165513	Y	0.0	0	Y	0.0	0	N	0.0	0
11	170955	4FNB	Y	88.3	170948	Y	0.0	0	Y	0.0	0	N	0.0	0
11	172330	4FNB	Y	91.5	172321	Y	0.0	0	Y	0.0	0	N	0.0	0
11	173550	4LNB	Y	85.4	173615	Y	0.0	0	Y	0.0	0	N	0.0	0
11	175050	4TNB	Y	97.0	175053	Y	0.0	0	Y	0.0	0	N	0.0	0
11	175430	1TNA	Y	105.0	175436	Y	0.0	0	Y	0.0	0	N	0.0	0
11	175700	8LNE	Y	88.5	175841	Y	0.0	0	Y	0.0	0	N	83.9	175409
11	175700	X	N	79.5	180032	N	0.0	0	N	0.0	0	N	0.0	0
11	180230	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	83.4	175944
11	180515	4FNB	Y	89.1	180457	Y	0.0	0	Y	0.0	0	Y	85.1	180220
11	180940	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	85.5	180635
11	181630	4LNB	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	83.9	181329
11	181820	1LNE	Y	0.0	0	Y	78.7	181705	Y	0.0	0	Y	90.7	181536
11	183730	ULNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
11	0	X	N	80.5	190106	N	0.0	0	N	0.0	0	N	0.0	0
11	0	X	N	78.3	190150	N	0.0	0	N	0.0	0	N	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
11	0	X	N	85.5	190223	N	0.0	0	N	0.0	0	N	0.0	0
11	190940	X	N	87.4	190354	N	0.0	0	N	0.0	0	N	0.0	0
11	190940	8TSH	Y	89.4	190754	Y	81.1	191051	Y	74.1	191116	Y	71.5	191212
12	81850	1TSA	Y	0.0	0	Y	83.9	81956	Y	77.4	82023	Y	83.8	82103
12	85038	1TNA	Y	103.8	85156	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	90049	1FNB	Y	85.3	90055	Y	76.1	85954	Y	75.5	91253	Y	91.1	85819
12	91329	1LNB	Y	83.3	91311	Y	86.8	91226	Y	76.8	91307	Y	90.6	91036
12	0	X	N	0.0	0	N	72.5	94557	N	116.5	91422	N	0.0	0
12	101444	1R	N	0.0	0	N	93.2	100356	N	0.0	0	N	0.0	0
12	102943	1LNE	Y	0.0	0	Y	81.5	102540	Y	0.0	0	Y	90.3	102827
12	103830	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	84.9	104628
12	0	X	N	98.2	112402	N	84.9	110151	N	0.0	0	N	92.4	112122
12	120352	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	82.7	120036
12	120620	1TSH	Y	0.0	0	Y	88.8	120735	Y	82.0	120757	Y	83.7	120841
12	120925	7TNA	Y	97.8	120922	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	121210	1TNA	Y	106.1	121208	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	122340	8TSA	Y	0.0	0	Y	74.5	122530	Y	0.0	0	Y	80.0	122707
12	0	X	N	106.1	123728	N	78.3	123618	N	0.0	0	N	89.6	123456
12	124910	1FNB	Y	98.4	124919	Y	80.3	124806	Y	0.0	0	Y	91.1	124650
12	125329	1TNA	Y	104.4	125403	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	125848	1TNA	Y	104.5	125958	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	130206	1FNB	Y	92.6	130311	Y	89.3	130203	Y	78.2	130202	Y	79.5	130039
12	131442	1GNA	Y	106.8	131623	Y	81.1	131503	Y	0.0	0	Y	90.3	131330
12	132059	8GNB	Y	108.7	132248	Y	73.6	132124	Y	0.0	0	Y	88.5	131956
12	133428	ULNE	Y	0.0	0	Y	78.4	133041	Y	76.1	133035	Y	90.4	132839
12	134200	8GNB	Y	108.6	134222	Y	78.1	134104	Y	0.0	0	Y	87.6	133933
12	135653	8GNB	Y	107.2	135721	Y	80.9	135556	Y	0.0	0	Y	85.5	135428
12	141601	8GNB	Y	107.0	141635	Y	79.3	141524	Y	71.3	141524	Y	78.6	141359
12	141851	3TNA	Y	103.7	141926	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	142601	2TNA	Pr	116.3	142545	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	142601	2TNA	Pr	116.3	142545	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	143000	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
12	143253	2TNA	Y	115.0	143223	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	143439	8GNB	Y	105.2	143428	Y	79.7	143307	Y	0.0	0	Y	86.5	143130
12	143527	UTNA	Y	87.4	143514	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	143825	3LNE	Y	0.0	0	Y	72.6	143657	Y	0.0	0	Y	81.6	143531
12	144158	2LNE	Y	0.0	0	Y	89.9	144052	Y	81.9	144102	Y	0.0	0
12	144552	2TNA	Y	115.2	144546	Y	0.0	0	Y	0.0	0	Y	84.7	145441
12	150940	1TNB	Y	99.6	150918	Y	0.0	150235	Y	0.0	0	Y	75.7	150448
12	152125	1LNB	Y	79.7	152130	Y	75.5	152122	Y	0.0	0	Y	86.2	151844
12	152455	4TNB	Y	97.6	152457	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	153000	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
12	153435	1TNB	Y	98.8	153439	Y	72.7	153443	Y	0.0	0	Y	0.0	0
12	153640	4GNB	Y	98.2	153647	Y	0.0	0	Y	0.0	0	Y	84.4	153415
12	153859	4TNB	Y	96.1	153908	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	154113	4TNB	Y	96.2	154134	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	154402	1FNB	Y	88.0	154444	Y	85.9	154339	Y	0.0	0	Y	0.0	0
12	154930	1LNB	Y	0.0	0	Y	80.8	154837	Y	0.0	0	Y	90.0	154728
12	0	X	N	0.0	0	N	91.4	155442	N	88.8	155453	N	96.4	155341
12	160100	4LNB	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	85.6	155801
12	160419	2FNB	Pr	95.1	160514	Pr	86.4	160442	Y	81.4	160450	Y	84.8	160103
12	160419	2FNB	Pr	95.1	160514	Pr	86.4	160442	Y	78.0	160527	Y	92.0	160352

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
12	160608	4GNB	Y	96.7	160724	N	84.2	160517	Y	0.0	0	Y	80.5	160418
12	161205	4TNB	Y	94.7	161154	Y	77.9	160805	Y	0.0	0	N	92.1	160635
12	161505	2FNB	Y	89.0	161424	Y	89.0	161351	Y	73.4	161451	Pr	92.8	161248
12	161520	2LNB	Y	0.0	0	Y	81.0	161431	Y	87.8	161402	Pr	92.8	161248
12	161740	4TNB	Y	96.8	161732	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	162013	4FNB	Y	87.1	162015	Y	0.0	0	Y	0.0	0	Y	85.3	161744
12	162209	UTNA	Y	78.4	162215	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	162306	2LNB	Y	0.0	0	Y	82.8	162206	Y	74.5	162225	Y	93.3	162114
12	162552	4GNB	Y	96.9	162607	Y	0.0	0	Y	0.0	0	Y	83.9	162325
12	163157	4LNB	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.7	162919
12	163442	4FNB	Y	91.5	163513	Y	0.0	0	Y	0.0	0	Y	84.8	163250
12	163904	1LNE	Y	0.0	0	Y	85.5	163902	Y	0.0	0	Y	91.1	163641
12	164038	4TNB	Y	97.4	164125	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	164447	4LNB	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.4	164255
12	164754	4LNB	Y	86.0	164846	Y	0.0	0	Y	0.0	0	Y	84.7	164602
12	165012	4TNB	Y	100.3	165108	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	165510	X	N	89.9	165508	N	0.0	0	N	0.0	0	N	0.0	0
12	165510	4TNB	Y	100.2	165624	Y	0.0	0	Y	0.0	0	Y	0.0	0
12	170037	8LNE	Y	85.2	170229	Y	77.3	170038	Y	0.0	0	Y	86.0	165858
12	170429	4LNB	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.5	170249
12	170920	1LNB	Y	90.3	171058	Y	0.0	0	Y	0.0	0	Y	84.8	170803
12	172711	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
12	175915	1R	N	0.0	0	Y	81.5	175725	N	0.0	0	N	0.0	0
12	182514	2R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
12	0	X	N	76.3	182736	N	0.0	0	N	0.0	0	N	0.0	0
12	0	X	N	82.0	184210	N	0.0	0	N	0.0	0	N	0.0	0
12	0	X	N	78.4	185106	N	0.0	0	N	0.0	0	N	0.0	0
12	0	X	N	76.0	185232	N	0.0	0	N	0.0	0	N	76.8	191410
12	0	X	N	76.1	185436	N	0.0	0	N	0.0	0	N	0.0	0
13	82401	1LNE	Y	0.0	0	Y	82.8	82214	Y	0.0	0	Y	83.7	82038
13	84132	4TNA	Y	96.5	84114	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	85306	1GNB	Y	107.7	85245	Y	85.2	85113	Y	0.0	0	Y	96.0	84942
13	85705	1GNB	Y	104.8	85642	Y	94.3	85514	Y	0.0	0	Y	95.8	85335
13	90600	1FNB	Y	96.5	90532	Y	83.4	90407	Y	0.0	0	Y	95.3	90226
13	91156	1GNB	Y	104.7	91130	Y	85.5	90954	Y	0.0	0	Y	94.5	90826
13	91910	1GNB	Y	104.5	91823	Y	86.1	91641	Y	0.0	0	Y	94.8	91509
13	92649	1GNB	Y	105.5	92600	Y	85.5	92425	Y	0.0	0	Y	94.7	92246
13	93146	1LNB	Y	0.0	0	Y	86.2	93000	Y	0.0	0	Y	96.2	92822
13	93436	4TNA	Y	94.7	93435	Y	0.0	0	Y	0.0	0	N	92.4	93002
13	94103	1GNB	Y	103.3	94100	Y	85.2	93917	Y	0.0	0	Y	95.1	93742
13	94625	1TNA	Y	109.4	94624	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	94931	1TNA	Y	114.3	94950	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	95337	1LNB	Y	0.0	0	Y	83.2	95223	Y	0.0	0	Y	95.2	95046
13	101509	1TNA	Y	107.2	101455	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	102235	4TNA	Y	97.5	102210	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	0	X	N	81.8	104533	N	0.0	0	N	72.3	102834	N	79.9	103124
13	110032	4TNA	Y	94.7	110015	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	111504	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.9	111142
13	114953	3LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	93.5	114653
13	115438	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	85.2	115149
13	115856	1LNE	Y	0.0	0	Y	82.6	115729	Y	0.0	0	Y	93.2	115609
13	120044	4TNA	Y	100.6	120057	Y	0.0	0	Y	0.0	0	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
13	121014	1TNB	Y	104.4	121053	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	122442	4TNA	Y	97.3	122518	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	123025	1FNB	Y	98.9	123041	Y	84.4	122912	Y	0.0	0	Y	93.9	122758
13	124101	8LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	124101	1GNA	Y	108.1	124147	Y	85.1	124012	Y	0.0	0	Y	93.3	123848
13	124422	1LNE	Y	0.0	0	Y	86.4	124327	Y	0.0	0	Y	85.4	124151
13	124733	4TNA	Y	96.8	124829	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	125324	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.7	125056
13	125528	3TNA	Y	106.7	125616	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	125827	1TNB	Y	106.4	125914	Y	71.5	125634	Y	0.0	0	Y	0.0	0
13	130339	4TNA	Y	98.6	130438	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	131300	1GNB	Y	107.8	131244	Y	84.5	131113	Y	0.0	0	Y	95.0	130955
13	132026	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.0	131734
13	132251	1GNA	Y	109.9	132329	Y	80.0	132211	Y	0.0	0	Y	89.3	132044
13	132611	2TNA	Y	115.3	132630	Y	72.1	132632	Y	79.0	132651	Y	0.0	0
13	132800	4TNA	Y	96.8	132858	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	133259	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
13	133429	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	80.8	133241
13	134300	2TNA	Pr	117.5	134401	Pr	72.2	134340	Pr	70.4	134419	Y	0.0	0
13	134300	2TNA	Pr	117.5	134401	Pr	72.2	134340	Pr	70.4	134419	Y	0.0	0
13	134641	7LNE	Y	0.0	0	Y	85.5	134651	Y	82.8	134701	Y	83.2	134526
13	135355	4TNA	Y	99.4	135352	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	140143	2TNA	Y	115.8	140129	Y	0.0	0	Y	75.3	140109	Y	0.0	0
13	140320	3TNA	Y	104.3	140325	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	140603	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.3	140248
13	142117	7TSH	Y	0.0	0	Y	87.5	142328	Y	81.5	142348	Y	77.2	142437
13	142913	3TNA	Y	103.2	143004	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	143436	4TNA	Y	103.4	143507	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	143817	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	85.7	143639
13	144418	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	83.6	144241
13	144750	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
13	145411	4LNE	Y	0.0	0	Y	75.4	145355	Y	0.0	0	Y	86.7	145223
13	150520	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
13	150536	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
13	150709	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.0	150535
13	151946	2LNE	Y	0.0	0	Y	90.3	151856	Y	87.3	151904	Pr	97.0	151758
13	151950	2FNB	Y	98.0	151925	Y	75.0	152117	Y	74.4	151959	Pr	97.0	151758
13	152906	2LNB	Y	0.0	0	Y	82.2	152808	Y	72.7	152822	Y	90.3	152707
13	153324	1GNB	Y	104.9	153323	Y	84.6	153149	Y	0.0	0	Y	93.3	153032
13	153743	4LNE	Y	0.0	0	Y	75.1	153630	Y	0.0	0	Y	87.9	153454
13	154510	1GNB	Y	105.8	154518	Y	85.9	154344	Y	0.0	0	Y	95.1	154223
13	155840	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	91.1	155710
13	155928	1FNF	Y	0.0	0	Y	91.5	155828	Y	0.0	0	Y	0.0	0
13	160058	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
13	160149	1GNA	Y	105.0	160226	N	0.0	0	Y	75.6	155843	Y	0.0	0
13	160429	4TNC	Y	97.2	160454	N	0.0	0	Y	71.8	160314	Y	0.0	0
13	0	X	N	80.2	160528	N	0.0	0	N	0.0	0	N	0.0	0
13	160801	4GNA	Y	95.6	160834	Y	0.0	0	Y	0.0	0	Y	75.2	160853
13	161339	1GNB	Y	105.8	161446	Y	89.6	161318	Y	0.0	0	Y	87.3	161153
13	161700	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.3	161415
13	162130	1FNF	Y	0.0	0	Y	86.9	162114	Y	0.0	0	Y	78.2	161956
13	162443	1GNC	Y	102.2	162611	Y	0.0	0	Y	0.0	0	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
13	162746	1LNB	Y	0.0	0	Y	77.0	162757	Y	0.0	0	Y	89.5	162638
13	162909	4TNA	Y	99.0	163035	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	163146	1LNC	Y	0.0	0	Y	78.7	163336	Y	72.4	163354	Y	78.7	163101
13	163645	2FNB	Y	94.9	163811	Y	87.2	163738	Y	84.7	163747	Pr	100.4	163640
13	164010	2FNB	Y	95.3	164144	Y	82.6	163832	Y	81.6	163901	Pr	100.4	165020
13	164543	2FNF	Y	0.0	0	Y	88.4	164116	Y	83.7	164120	Y	0.0	0
13	164721	2FND	Y	0.0	0	Y	85.8	164656	Y	85.0	164227	Y	0.0	0
13	164904	2FND	Pr	111.7	164854	Y	85.0	164924	Y	84.9	164714	Y	0.0	0
13	164951	2FND	Pr	111.7	164854	Y	83.4	165039	Y	84.4	164938	Y	0.0	0
13	165056	2FND	Y	113.0	165054	Y	90.0	165122	Y	88.1	165138	Y	0.0	0
13	165143	2FND	Y	109.2	165144	Y	84.6	165206	Y	84.5	165231	Y	0.0	0
13	165256	2FND	Y	110.5	165254	Y	82.8	165237	Y	86.9	165342	Y	0.0	0
13	165342	2FND	Y	110.0	165347	Y	88.7	165329	Y	0.0	0	Y	0.0	0
13	165500	2LND	Y	0.0	0	Y	88.0	165443	Y	87.1	165429	Y	0.0	0
13	165600	2LND	Y	0.0	0	Y	89.6	165540	Y	0.0	0	Y	0.0	0
13	171337	2R	N	0.0	0	Y	73.8	171135	N	0.0	0	N	0.0	0
13	172402	8LNE	Y	79.2	172733	Y	77.8	172538	Y	71.7	172553	Y	84.6	172410
13	174410	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	87.8	174405
13	17462	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.5	174642
13	175737	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	85.2	175454
13	180115	1LNE	Y	0.0	0	Y	84.1	175959	Y	0.0	0	Y	92.3	175819
13	180514	1LNE	Y	0.0	0	Y	85.0	180346	Y	0.0	0	Y	91.8	180221
13	182008	3LNE	Y	0.0	0	Y	78.4	181920	Y	0.0	0	Y	87.6	181751
13	182848	1TNB	Y	102.6	182904	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	184020	1GNB	Y	106.1	184055	Y	81.9	183916	Y	0.0	0	Y	93.7	183750
13	185206	1GNB	Y	104.4	185233	Y	80.8	185100	Y	0.0	0	Y	92.1	184929
13	185433	8TSB	Y	0.0	0	Y	85.7	185612	Y	78.4	185639	Y	76.9	185744
13	190334	1GNB	Y	105.1	190420	Y	73.9	190258	Y	0.0	0	Y	94.7	190123
13	191752	1GNB	Y	104.6	191849	Y	85.8	191708	Y	0.0	0	Y	91.2	191538
13	193013	1GNB	Y	104.1	193109	Y	84.8	192930	Y	0.0	0	Y	93.4	192753
13	193610	1TNA	Y	100.5	193653	Y	0.0	0	Y	0.0	0	Y	0.0	0
13	194125	1GNB	Y	101.8	194226	Y	78.9	194046	Y	0.0	0	Y	91.4	193924
13	195322	1GNC	Y	103.9	195432	Y	84.9	195255	Y	0.0	0	Y	0.0	0
13	0	X	N	90.6	200252	N	83.9	200138	N	0.0	0	N	92.9	195021
13	0	X	N	104.0	200735	N	83.6	200557	N	0.0	0	N	98.6	195133
14	80708	1FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	81002	1GNB	Y	109.2	81042	Y	0.0	0	Y	0.0	0	Y	94.3	80441
14	82357	1GNA	Y	105.3	82447	Y	89.3	82324	Y	0.0	0	Y	92.0	82148
14	83517	2TNA	Pr	115.1	83607	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	83544	2TNA	Pr	115.1	83607	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	83711	3TNA	Y	105.4	83803	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	0	X	N	0.0	0	N	91.3	90121	N	94.0	90044	N	0.0	0
14	90422	1LNE	Y	0.0	0	Y	88.3	90250	Y	82.9	90205	Y	0.0	0
14	91351	1TNB	Y	95.8	91503	Y	76.6	90806	Y	0.0	0	Y	0.0	0
14	0	X	N	78.1	92133	N	94.4	93022	N	91.6	93050	N	0.0	0
14	92447	1FNB	Y	91.8	92612	Y	91.7	92124	Y	0.0	0	Y	90.8	92320
14	93627	1GNB	Y	104.7	93802	Y	83.7	93626	Y	0.0	0	Y	92.6	93459
14	93959	1TNA	Y	106.2	94132	Y	74.4	93729	Y	0.0	0	Y	0.0	0
14	95117	1GNB	Y	101.4	95251	Y	82.7	95122	Y	78.5	94944	Y	92.8	94949
14	95325	2FND	Y	106.5	95451	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	95402	2LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	96.8	95343
14	95547	2FND	Y	111.3	95720	Y	91.1	95437	Y	87.7	95441	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
14	95654	3MND	Y	104.3	95820	Y	93.8	95644	Y	84.1	95704	Y	83.1	95550
14	100033	2LND	Y	0.0	0	Y	99.7	95928	Y	97.2	95951	Y	76.9	95937
14	100233	3GND	Y	105.8	100242	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	100414	2TNA	Pr	115.4	100418	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	100414	2TNA	Pr	115.4	100418	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	100506	3GND	Y	105.9	100521	Y	0.0	0	Y	72.6	100503	Y	0.0	0
14	100627	1FNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	100719	2TNA	Pr	115.3	100734	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	100719	2TNA	Pr	115.3	100734	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	100805	3FND	Y	0.0	0	Y	78.8	100757	Y	85.3	100734	Y	0.0	0
14	100902	1GNA	Y	107.1	100954	Y	0.0	0	Y	81.1	100811	Y	92.9	100409
14	101026	3LND	Y	0.0	0	Y	0.0	0	Y	78.8	101036	Y	0.0	0
14	102635	1LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	78.4	102459
14	105007	9FNB	Y	94.5	105058	Y	81.6	104951	Y	70.5	105012	Y	88.4	104853
14	105643	3LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	83.9	105530
14	110203	9FNB	Y	110.8	110313	Y	83.8	110154	Y	0.0	0	Y	91.7	110052
14	110606	1TNA	Y	108.7	110711	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	111411	9LNB	Y	84.3	111554	Y	82.4	111359	Y	0.0	0	Y	91.6	111258
14	111639	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
14	113127	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
14	113548	1LNE	Y	0.0	0	Y	84.2	113442	Y	73.2	113459	Y	92.9	113311
14	120105	4TNA	Y	97.8	120236	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	120743	4TNH	Y	94.2	120714	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	121228	4GNA	Y	94.8	121158	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	124525	1TNA	Y	103.6	124502	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	125207	1TNB	Y	99.7	125139	Y	81.6	125934	Y	0.0	0	Y	0.0	0
14	130446	1FNB	Y	94.2	130432	Y	86.5	130317	Y	0.0	0	Y	91.4	130151
14	131723	4LNE	Y	0.0	0	N	89.5	131214	Y	0.0	0	Y	85.6	131447
14	132100	1GNB	Y	109.4	132047	Y	83.7	131924	Y	0.0	0	Y	94.4	131801
14	134719	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	83.5	134459
14	135900	3TNA	Y	104.7	135927	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	143054	1TNA	Y	108.9	143021	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	144551	1LNE	Y	0.0	0	Y	72.0	144402	Y	0.0	0	Y	85.3	144243
14	0	X	N	77.2	152447	N	88.8	140706	N	0.0	0	N	82.2	152945
14	152539	3LNE	Y	83.8	153125	Y	76.8	152340	Y	0.0	0	Y	84.6	152209
14	153637	1FNB	Y	96.1	153610	Y	74.7	153451	Y	0.0	0	Y	87.2	153353
14	154813	1TNB	Y	104.6	154753	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	155600	4GNA	Y	94.0	155543	Y	78.0	155645	Y	0.0	0	Y	85.4	155254
14	0	X	N	97.6	155803	N	0.0	0	N	0.0	0	N	0.0	0
14	160046	7TNH	Y	104.5	160034	Y	0.0	0	Y	0.0	0	Y	0.0	0
14	160205	1LNB	Y	0.0	0	Y	82.6	160031	Y	0.0	0	Y	91.4	155922
14	160509	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.9	160243
14	160803	4FNA	Y	86.7	160815	Y	0.0	0	Y	0.0	0	Y	79.1	160537
14	161027	1GNB	Y	107.2	161048	Y	80.0	160922	Y	0.0	0	Y	94.9	160811
14	161312	2FND	Y	82.7	161300	Pr	88.0	161234	Pr	84.0	161247	Y	0.0	0
14	161312	2LNE	Y	0.0	0	Pr	88.0	161234	Pr	84.0	161247	Y	96.2	161145
14	161546	2LND	Y	0.0	0	Y	82.1	161503	Y	81.7	161525	Y	0.0	0
14	161714	2LNE	Y	0.0	0	Y	84.7	161645	Y	82.1	161650	Y	93.0	161552
14	162034	2LNE	Y	0.0	0	Y	84.0	162016	Y	77.5	162021	Y	94.3	161920
14	162310	4FNB	Y	87.2	162335	Y	0.0	0	Y	0.0	0	Y	85.3	162112
14	162512	1FNB	Y	95.8	162542	Y	83.1	162425	Y	0.0	0	Y	86.1	162325
14	162746	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.3	162533

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
14	163443	4FNB	Y	88.0	163518	Y	0.0	0	Y	0.0	0	Y	83.4	163246
14	163737	1GNB	Y	106.0	163837	Y	77.7	163708	Y	0.0	0	Y	91.4	163547
14	164800	4FNB	Y	85.1	164844	Y	0.0	0	Y	0.0	0	Y	85.4	164611
14	165100	1GNB	Y	106.3	165154	Y	79.2	165028	Y	0.0	0	Y	91.5	164918
14	170323	1FNB	Y	97.4	170415	Y	79.5	170259	Y	0.0	0	Y	91.8	170140
14	171451	1GNB	Y	105.8	171559	Y	76.4	171428	Y	0.0	0	Y	92.5	171307
14	172806	1GNB	Y	105.8	172918	Y	77.2	172747	Y	0.0	0	Y	90.8	172628
14	173748	2FNH	Y	102.8	173840	Y	81.1	173808	Y	0.0	0	Y	87.0	173739
14	174140	1GNB	Y	106.6	174304	Y	78.3	174129	Y	0.0	0	Y	91.8	174027
14	175622	1FNB	Y	101.7	175743	Y	75.2	175610	Y	0.0	0	Y	92.8	175454
14	181055	1LNB	Y	0.0	0	Y	77.3	181050	Y	0.0	0	Y	92.6	180933
14	185545	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.5	185415
14	190118	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
14	192114	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
15	0	X	N	97.1	81519	N	0.0	0	N	0.0	0	N	0.0	0
15	0	X	N	81.9	82637	N	0.0	0	N	0.0	0	N	86.9	80610
15	85200	4TSA	Y	0.0	0	N	0.0	0	Y	0.0	0	N	88.8	81247
15	82800	1LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	89.0	82425
15	85806	1FNB	Y	101.9	85816	N	0.0	0	Y	0.0	0	Y	89.5	85604
15	90314	4TSA	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	80.4	90703
15	91019	1FNB	Y	93.4	91056	N	0.0	0	Y	0.0	0	Y	91.8	90834
15	92044	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
15	92315	1LNB	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	95.8	92128
15	92539	4LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	83.2	92413
15	93119	4TSA	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
15	94432	4LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	83.5	94300
15	95300	1TSA	Y	84.2	95432	N	0.0	0	Y	0.0	0	Y	0.0	0
15	100029	4TSA	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
15	100234	4TSA	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
15	101045	1LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	91.5	100945
15	101645	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
15	101803	1TSA	Y	88.4	102010	N	0.0	0	Y	83.4	102129	Y	80.3	102229
15	102640	1LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	91.8	102555
15	104832	4TSA	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	77.1	105457
15	110457	4LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	84.6	110230
15	110523	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
15	110523	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
15	111136	1LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	93.6	110836
15	112709	1LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	92.2	112432
15	113157	4LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	83.4	112945
15	113637	7LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	83.2	113451
15	114033	4TSA	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
15	114740	1LNE	Y	0.0	0	N	79.9	114641	Y	0.0	0	Y	92.1	114528
15	115117	1TSA	Y	0.0	0	N	88.5	115258	Y	83.9	115325	Y	81.2	115435
15	121845	4TSA	Y	0.0	0	Y	78.1	122036	Y	0.0	0	Y	74.8	122233
15	122203	7TSB	Y	82.3	122254	Y	91.7	122400	Y	86.8	122440	Y	0.0	0
15	123028	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	83.8	122859
15	123914	4TSH	Y	0.0	0	Y	80.6	124112	Y	0.0	0	Y	80.1	124252
15	125806	1LNE	Y	0.0	0	Y	81.9	125744	Y	0.0	0	Y	92.2	125632
15	130351	4TSH	Y	0.0	0	Y	79.5	130613	Y	0.0	0	Y	74.2	130757
15	131344	1TSH	Y	0.0	0	Y	90.5	131611	Y	81.8	131634	Y	78.9	131733
15	132503	1FSF	Y	88.7	132615	Y	0.0	0	Y	0.0	0	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
15	133359	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	83.9	133311
15	133818	1GNB	Y	103.1	134026	Y	78.4	133901	Y	0.0	0	Y	92.6	133711
15	135135	1FNB	Y	85.9	135328	Y	83.2	135222	Y	75.7	135313	Y	93.5	135052
15	135456	4TNH	Y	95.8	135659	Y	0.0	0	Y	0.0	0	Y	0.0	0
15	140125	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	83.3	140107
15	140800	1LNB	Y	0.0	0	Y	80.6	140846	Y	0.0	0	Y	94.3	140708
15	142557	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.5	142551
15	143130	4TSH	Y	0.0	0	Y	80.9	143236	Y	0.0	0	Y	0.0	0
15	143802	1LNE	Y	0.0	0	Y	79.9	143910	Y	0.0	0	Y	93.3	143738
15	145227	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.0	144942
15	152710	1R	N	0.0	0	Y	77.6	151600	N	0.0	0	N	0.0	0
15	154035	1R	N	0.0	0	Y	80.1	155507	N	0.0	0	N	80.6	154253
15	160546	4TNA	Y	95.6	160536	Y	0.0	0	Y	0.0	0	Y	0.0	0
15	160757	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	85.0	160455
15	161223	2LNE	Y	0.0	0	Y	85.2	161126	Y	82.7	161142	Y	85.6	161030
15	161525	2MND	Y	116.1	161512	Y	86.8	161419	Y	83.1	161423	Y	96.6	161309
15	161739	2GND	Y	109.9	161729	Y	75.3	161709	Y	77.8	161732	Y	0.0	0
15	161841	4LNE	Y	80.1	161842	Y	72.5	161924	Y	70.8	161814	Y	0.0	0
15	161943	2FND	Y	98.9	161932	Y	73.3	161949	Y	0.0	0	Y	0.0	0
15	162131	2LND	Y	0.0	0	Y	75.0	162127	Y	77.1	162026	Y	0.0	0
15	162237	2MND	Y	108.6	162237	Y	88.9	162218	Y	86.0	162232	Y	101.2	162119
15	162429	2LND	Y	0.0	0	Y	75.2	162440	Y	77.7	162311	Y	0.0	0
15	162640	UTNA	Y	94.9	162713	Y	0.0	0	Y	0.0	0	Y	0.0	0
15	162925	1LNE	Y	0.0	0	Y	81.8	162828	Y	0.0	0	Y	94.2	162701
15	163102	4TNA	Y	98.4	163138	Y	0.0	0	Y	0.0	0	Y	0.0	0
15	171746	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.4	171527
15	172210	1FNB	Y	81.2	172146	Y	82.5	172049	Y	0.0	0	Y	93.7	171925
15	172347	4TSH	Y	0.0	0	Y	78.7	172417	Y	0.0	0	Y	81.1	172555
15	172649	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
15	173530	1MNC	Y	102.1	173517	Y	85.4	173338	Y	0.0	0	Y	93.7	173157
15	174110	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.9	173801
15	174443	1LNB	Y	0.0	0	Y	82.5	174126	Y	0.0	0	Y	84.8	174242
15	174540	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
15	174756	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
15	175220	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
15	175506	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	85.2	175204
15	180728	7LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	81.0	180318
15	181227	1TNA	Y	107.0	181250	Y	0.0	0	Y	0.0	0	Y	0.0	0
15	182851	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
15	183705	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
15	184107	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.2	183859
15	185737	2LNE	Y	0.0	0	Y	87.9	185659	Y	91.3	185712	Y	99.5	185527
15	193205	4MNC	Y	90.9	193250	Y	0.0	0	Y	0.0	0	Y	82.7	193023
15	193739	4FNC	Y	77.6	193814	Y	0.0	0	Y	86.6	193704	Y	0.0	0
15	194145	4LNC	Y	0.0	0	Y	88.1	194103	Y	0.0	0	Y	82.9	194050
15	194452	8LNE	Y	0.0	0	Y	73.4	194423	Y	0.0	0	Y	83.4	194252
18	80152	2TNA	Pr	121.7	80136	Y	0.0	0	Y	74.7	80130	Y	0.0	0
18	80152	2TNA	Pr	121.7	80136	Y	0.0	0	Y	74.7	80130	Y	0.0	0
18	81600	1LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	83826	X	N	89.2	83741	N	0.0	0	N	0.0	0	N	0.0	0
18	83826	1LNE	Y	91.7	84121	Y	84.4	83707	Y	80.4	83721	Y	0.0	0
18	92257	X	N	86.8	92118	N	0.0	0	N	0.0	0	N	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
18	92257	9LNE	Y	92.5	92313	Y	81.2	92231	Y	0.0	0	Y	91.9	92144
18	92257	X	N	78.8	92518	N	0.0	0	N	0.0	0	N	0.0	0
18	92257	X	N	76.8	92537	N	0.0	0	N	0.0	0	N	0.0	0
18	93000	1TNA	Y	109.3	93045	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	0	X	N	77.3	93946	N	0.0	0	N	0.0	0	N	85.8	93030
18	0	X	N	76.4	94135	N	0.0	0	N	0.0	0	N	0.0	0
18	0	X	N	80.3	94216	N	0.0	0	N	0.0	0	N	0.0	0
18	94632	X	N	86.2	94324	N	0.0	0	N	0.0	0	N	0.0	0
18	94632	X	N	77.8	94402	N	0.0	0	N	0.0	0	N	0.0	0
18	94632	X	N	83.7	94501	N	0.0	0	N	0.0	0	N	0.0	0
18	94632	X	N	78.1	94530	N	0.0	0	N	0.0	0	N	0.0	0
18	94632	7TSA	Y	85.5	94617	Y	102.3	94842	Y	94.3	94917	Y	91.2	95028
18	0	X	N	76.9	101355	N	0.0	0	N	0.0	0	N	74.5	101127
18	0	X	N	77.1	102201	N	0.0	0	N	0.0	0	N	72.3	101604
18	102337	9TNA	Y	104.0	102429	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	102502	X	N	81.1	102541	N	0.0	0	N	0.0	0	N	0.0	0
18	102502	1LNE	Y	93.5	102719	Y	80.9	102437	Y	0.0	0	Y	89.5	102341
18	0	X	N	82.8	102848	N	0.0	0	N	0.0	0	N	0.0	0
18	0	X	N	77.7	102931	N	0.0	0	N	0.0	0	N	0.0	0
18	103155	X	N	85.2	103033	N	0.0	0	N	0.0	0	N	0.0	0
18	103155	1TSA	Y	90.0	10322	Y	91.7	103410	Y	87.6	103448	Y	79.9	103530
18	104053	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
18	104642	4R	N	77.0	104650	N	0.0	0	N	0.0	0	N	0.0	0
18	105058	1TNA	Y	110.4	105219	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	105058	X	N	83.7	105247	N	0.0	0	N	0.0	0	N	0.0	0
18	110450	X	N	80.3	110525	N	0.0	0	N	0.0	0	N	0.0	0
18	110453	4TNA	Y	99.0	110631	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	111724	7MND	Y	101.4	111706	Y	77.8	111632	Y	0.0	0	Y	83.0	111607
18	112207	7LND	Y	90.9	112121	Y	84.4	112050	Y	0.0	0	Y	0.0	0
18	112227	9R	N	0.0	0	Y	77.1	112302	N	0.0	0	N	0.0	0
18	0	X	N	88.4	112440	N	79.9	112748	N	0.0	0	N	0.0	0
18	0	X	N	83.7	112502	N	77.1	113026	N	0.0	0	N	0.0	0
18	0	X	N	83.3	113135	N	83.6	113226	N	76.2	113241	N	0.0	0
18	113625	9R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
18	0	X	N	79.9	113853	N	0.0	0	N	0.0	0	N	79.9	113723
18	114814	4LNE	Y	90.6	114758	Y	73.4	114718	Y	0.0	0	Y	78.2	114625
18	114814	X	N	79.6	114914	N	0.0	0	N	0.0	0	N	0.0	0
18	114957	1TNA	Y	108.5	115009	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	0	X	N	78.6	120533	N	0.0	0	N	0.0	0	N	0.0	0
18	0	X	N	78.8	120601	N	0.0	0	N	0.0	0	N	0.0	0
18	0	X	N	81.2	120723	N	0.0	0	N	0.0	0	N	0.0	0
18	121534	7TNA	Y	113.0	121530	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	130731	4TNA	Y	98.5	130720	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	132105	2FNB	Pr	115.1	132056	Pr	89.6	132037	Pr	87.1	132059	Pr	98.0	132007
18	132105	2FNB	Pr	115.1	132056	Pr	89.6	132037	Pr	87.1	132059	Pr	98.0	132007
18	133217	2FSD	Pr	117.0	133138	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	133235	2LSD	N	0.0	133138	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	133425	2LSD	Y	107.0	133343	Y	0.0	0	Y	0.0	0	Y	0.0	0
18	140953	1LNE	Y	90.5	140955	Y	73.8	140918	Y	0.0	0	Y	0.0	0
18	140953	X	N	77.1	141122	N	0.0	0	N	0.0	0	N	0.0	0
18	140953	X	N	77.2	141143	N	0.0	0	N	0.0	0	N	0.0	0
18	0	X	N	113.4	145818	N	0.0	0	N	0.0	0	N	73.8	151414

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	ACRT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
18	160448	8LNE	Y	87.7	160400	Y	81.4	160331	Y	75.7	160350	Y	0.0	0
18	160448	X	N	77.8	160515	N	0.0	0	N	0.0	0	N	0.0	0
18	0	X	N	87.5	161154	N	0.0	0	N	0.0	0	N	0.0	0
18	0	X	N	79.0	161707	N	0.0	0	N	0.0	0	N	0.0	0
18	161837	4LNE	Y	0.0	0	Y	71.9	161636	Y	79.5	161834	Y	85.0	161536
18	170054	1LNE	Y	75.7	170049	Y	86.4	165903	Y	0.0	0	Y	96.5	165807
18	171734	X	N	88.6	171103	N	0.0	0	N	0.0	0	N	0.0	0
18	171734	X	N	83.7	171334	N	0.0	0	N	0.0	0	N	0.0	0
18	171734	X	N	84.0	171351	N	0.0	0	N	0.0	0	N	0.0	0
19	171734	8TSB	Y	87.3	171539	Y	79.9	171831	Y	0.0	0	Y	0.0	0
18	183534	7LNE	Y	94.0	183450	Y	0.0	0	Y	72.7	183426	Y	80.3	183305
18	192206	X	N	76.9	191706	N	0.0	0	N	0.0	0	N	0.0	0
18	192206	7TSH	Y	80.9	192112	Y	97.3	192336	Y	91.6	192416	Y	86.2	192520
18	192206	X	N	78.5	192142	N	0.0	0	N	76.5	192447	N	0.0	0
18	194606	1LNE	Y	0.0	0	Y	83.0	194428	Y	0.0	0	Y	84.6	194329
19	81000	4TNA	Y	96.1	81006	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	82333	1TNA	Y	106.7	82443	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	82950	1TNA	Y	105.2	83101	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	83119	1LNE	Y	0.0	0	Y	88.4	83102	Y	72.0	83126	Y	95.9	82948
19	84202	1TNB	Y	100.5	84324	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	85057	1GNA	Y	107.5	85224	Y	82.2	85052	Y	0.0	0	Y	95.0	85005
19	85550	1FNB	Y	102.4	85727	Y	87.2	85549	Y	77.8	85823	Y	95.5	85440
19	90114	3TNA	Y	105.8	90224	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	90551	1FNB	Y	100.6	90709	Y	84.4	90548	Y	0.0	0	Pr	96.5	90441
19	91030	1FNF	Y	0.0	0	Y	72.9	90700	Y	0.0	0	Y	0.0	0
19	91330	1GNA	Y	106.1	91527	Y	84.9	91056	Y	0.0	0	Y	95.1	90933
19	91534	2TNA	Pr	122.5	91711	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	91534	2TNA	Pr	122.5	91711	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	91858	1FNG	Y	0.0	0	Y	72.1	91638	Y	0.0	0	Y	0.0	0
19	92124	1LNG	Y	0.0	0	Y	83.9	91917	Y	0.0	0	Y	0.0	0
19	92709	1GNB	Y	109.2	92902	Y	86.5	92745	Y	0.0	0	Y	95.4	92603
19	92839	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
19	93736	1FNB	Y	98.1	93938	Y	85.6	93824	Y	0.0	0	Y	95.7	93700
19	95058	1LNB	Y	0.0	0	Y	89.1	95209	Y	72.3	95227	Y	88.7	95053
19	100634	1TSA	Y	0.0	0	Y	93.5	101006	Y	89.0	101046	Y	0.0	0
19	101813	3TNA	Y	104.7	101744	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	102444	3FNB	Y	89.5	102416	Y	81.0	102324	Y	76.6	102338	Y	87.0	102159
19	103639	3MND	Y	97.4	103607	Y	75.9	103519	Y	73.9	103535	Y	84.4	103356
19	103907	3FND	N	0.0	0	Y	0.0	0	N	0.0	0	Y	0.0	0
19	104148	3LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	104639	4TNA	Y	98.2	104644	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	105418	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	88.0	105141
19	110118	4GNA	Y	97.8	110118	Y	71.5	110000	Y	0.0	0	Y	86.6	105843
19	111745	4GNB	Y	99.0	111745	N	93.6	111352	Y	85.1	111411	Y	91.0	111534
19	112047	6LNE	Y	0.0	0	Y	93.4	111945	Y	89.2	112007	Y	99.3	111832
19	112703	2LNE	Y	0.0	0	Y	89.2	112650	Y	84.8	112709	Y	96.6	112607
19	113320	4GNB	Y	96.9	113338	Y	0.0	0	Y	0.0	0	Y	86.0	113123
19	113511	2LNE	Y	0.0	0	Pr	89.7	113429	Y	84.5	113457	Pr	91.9	113353
19	113511	2LNE	Y	0.0	0	Pr	89.7	113429	Y	84.5	113457	Pr	91.9	113353
19	113905	6TNA	Y	119.4	113938	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	114206	1TNA	Y	104.7	114232	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	0	X	N	80.9	114346	N	0.0	0	N	0.0	0	N	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
19	114619	4LNB	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	88.3	114457
19	115158	3FNB	Y	89.8	115249	Y	82.4	115159	Y	79.8	115211	Y	84.6	115046
19	115507	1TNA	Y	104.2	115601	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	115916	1LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	120606	3MND	Y	94.8	120514	Y	78.3	120423	Y	75.5	120443	Y	85.7	120259
19	120849	3LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	121013	1TNA	Y	104.3	120935	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	122341	2TNA	Y	113.5	122253	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	122747	1FNA	Y	97.2	122729	Y	88.1	122616	Y	75.1	122646	Y	96.5	122505
19	123509	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	84.5	122823
19	124424	1GNB	Y	111.7	124418	Y	86.9	124254	Y	71.5	124301	Y	95.3	124137
19	124647	1TNA	Y	107.9	124628	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	125209	1TNA	Y	104.7	125153	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	125922	1FNB	Y	98.3	125914	Y	87.7	125803	Y	0.0	0	Y	94.7	125653
19	130536	1LNE	Y	0.0	0	Y	86.3	130405	Y	0.0	0	Y	94.6	130248
19	131057	2TNA	Y	109.0	131032	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	131307	1FNB	Y	98.7	131255	Y	83.9	131155	Y	0.0	0	Pr	97.6	131035
19	132750	1FNF	Y	80.5	132600	Y	82.6	132640	Y	0.0	0	Y	0.0	0
19	132916	1LNE	Y	0.0	0	Y	92.2	132747	Y	0.0	0	Y	84.8	132904
19	133049	1GNC	Y	111.2	133049	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	133434	4TNA	Y	100.2	133358	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	133617	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.3	133323
19	133806	1GNC	Y	111.3	133746	Y	84.0	133632	Y	93.3	133624	Y	0.0	0
19	134223	1LNC	Y	0.0	0	Y	97.1	134103	Y	73.8	134125	Y	0.0	0
19	134810	1TSB	Y	0.0	0	Y	83.4	134918	Y	0.0	0	Y	0.0	0
19	135300	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
19	135500	4TNA	Y	95.9	135456	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	135645	2MND	Y	93.5	135620	Y	85.5	135557	Y	81.0	135622	Y	92.8	135521
19	135824	2LND	Y	0.0	0	Y	75.2	135757	Y	70.7	135950	Y	0.0	0
19	140102	1GNA	Y	106.7	140100	Y	87.5	135925	Y	0.0	0	Y	96.1	135817
19	141438	1TNA	Y	102.0	141447	Y	78.6	140703	Y	0.0	0	Y	0.0	0
19	141609	1FNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	141847	1GNB	Y	109.3	141923	Y	86.1	141454	Y	0.0	0	Y	94.7	141348
19	142152	4TNB	Y	94.5	142153	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	142905	4FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	75.2	142149
19	143122	4GNB	Y	97.0	143115	Y	0.0	0	Y	0.0	0	Y	77.0	142622
19	143422	1FNB	Y	94.0	143358	Y	85.3	143242	Y	0.0	0	Y	93.9	143122
19	143649	1GNB	Y	105.5	143638	Y	84.9	143503	Y	0.0	0	Y	96.2	143350
19	143901	4FNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	144146	4GNB	Y	98.8	144142	Y	0.0	0	Y	0.0	0	Y	85.9	143635
19	144500	4FNB	Y	90.8	144458	Y	0.0	0	Y	0.0	0	Y	85.6	144244
19	144817	1GNB	Y	105.7	144825	Y	85.8	144654	Y	0.0	0	Y	93.8	144529
19	145123	1FNB	Y	97.8	145123	Y	85.2	145008	Y	0.0	0	Y	95.1	144849
19	145253	1TNB	Y	103.3	145305	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	145638	4FNB	Y	94.5	145705	Y	70.6	145600	Y	0.0	0	Y	86.5	145447
19	150010	4GNB	Y	96.9	145955	Y	72.7	145845	Y	0.0	0	Y	85.7	145729
19	150230	1FNB	Y	96.9	150158	Y	82.0	150059	Y	0.0	0	Y	93.8	145943
19	150533	4TNA	Y	96.3	150513	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	150604	1MNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	93.7	150320
19	150846	1GNC	Y	107.5	150851	Y	85.8	150429	Y	0.0	0	Y	0.0	0
19	151036	4MNC	Y	97.4	151034	Y	0.0	0	Y	0.0	0	Y	82.0	150821
19	151222	4TNA	Y	97.7	151211	Y	0.0	0	Y	0.0	0	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
19	151359	1GNC	Y	107.5	151410	Y	95.9	151237	Y	83.3	151253	Y	0.0	0
19	151543	1MNF	Y	0.0	0	Y	81.6	151417	Y	0.0	0	Y	93.7	151310
19	151608	4GNC	Y	96.0	151629	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	151726	4GNC	Y	97.2	151753	Y	73.3	151646	Y	0.0	0	Y	0.0	0
19	151812	1FNB	Y	98.1	151851	Y	76.9	151838	Y	0.0	0	Y	0.0	0
19	152003	3TNA	Y	105.4	152028	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	152151	1GNC	Y	108.6	152246	Y	81.6	152109	Y	71.5	152104	Y	0.0	0
19	152304	4FNC	Y	89.7	152336	Y	72.8	152231	Y	0.0	0	Y	0.0	0
19	152413	2TNA	Y	113.4	152435	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	152519	4GNB	Y	96.9	152618	Y	72.9	152448	Y	0.0	0	Y	0.0	0
19	152733	1GNB	Y	106.7	152805	Y	0.0	0	Y	0.0	0	Y	94.1	152808
19	152909	4GNC	Y	96.0	152946	Y	76.3	152824	Y	93.6	152628	Y	0.0	0
19	153012	1GNC	Y	106.2	153109	Y	86.3	152937	Y	0.0	0	Y	0.0	0
19	153545	4FNC	Y	91.3	153524	Y	77.7	153421	Y	0.0	0	Y	0.0	0
19	153727	1GNC	Y	105.6	153706	Y	80.8	153521	Y	89.6	153543	Y	0.0	0
19	153838	4MNC	Y	90.6	153804	Y	0.0	0	Y	0.0	0	Y	86.1	153543
19	154051	4GNC	Y	98.0	154046	Y	82.8	153918	Y	86.1	153927	Y	0.0	0
19	154310	1MNC	Y	103.1	154250	Y	84.6	154121	Y	0.0	0	Y	94.0	153951
19	154417	1GNB	Y	106.7	154357	Y	85.7	154224	Y	0.0	0	Y	0.0	0
19	154551	4GNC	Y	96.2	154553	Y	74.6	154445	Y	86.7	154434	Y	0.0	0
19	154716	1GNC	Y	107.3	154728	Y	93.2	154600	Y	75.4	154625	Y	0.0	0
19	154819	UFNA	Y	97.5	154817	Y	0.0	0	Y	0.0	0	Y	81.3	154631
19	155209	1LNE	Y	0.0	0	Y	85.6	155029	Y	0.0	0	Y	96.4	154902
19	155341	4FNB	Y	92.1	155351	Y	0.0	0	Y	0.0	0	Y	85.5	155123
19	155420	4GNC	Y	91.2	155443	Y	74.1	155316	Y	75.1	155321	Y	0.0	0
19	155650	1LNB	Y	0.0	0	Y	86.5	155533	Y	0.0	0	Y	94.8	155407
19	155841	1GNB	Y	107.5	155902	Y	86.2	155752	Y	0.0	0	Y	96.8	155621
19	160037	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
19	0	X	N	92.1	160148	N	0.0	0	N	0.0	0	N	81.3	155959
19	160331	1GNC	Y	106.6	160356	Y	82.7	160232	Y	0.0	0	Y	0.0	0
19	160445	4TNC	Y	97.6	160546	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	160524	4LNB	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.8	160348
19	160910	1LNC	Y	0.0	0	Y	80.5	160722	Y	0.0	0	Y	0.0	0
19	161117	4LNC	Y	0.0	0	Y	84.8	160906	Y	0.0	0	Y	0.0	0
19	161249	4TSC	Y	0.0	0	Y	78.1	161437	Y	0.0	0	Y	0.0	0
19	161538	4FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	161737	4LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	161919	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	87.9	161351
19	162054	UFSB	Y	96.4	162003	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	162230	4TSC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	162617	4GNC	Y	98.0	162529	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	162835	4TSC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	162933	4TSC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	163047	UFSB	Y	95.5	163114	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	163239	4GNC	Y	94.7	163233	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	163402	4GNC	Y	96.7	163413	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	163437	4LNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	163550	4TSC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	163732	2FND	Y	96.3	163659	Y	71.0	163748	Y	0.0	0	Y	0.0	0
19	163804	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.4	163612
19	163837	4FNC	Y	88.9	163829	Y	78.2	163825	Y	0.0	0	Y	0.0	0
19	163915	2LND	Y	90.2	163956	Y	81.4	164015	Y	77.3	164043	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
19	164111	4LNC	Y	0.0	0	Y	0.0	0	Y	82.3	164230	Y	0.0	0
19	164440	4LNC	Y	0.0	0	Y	0.0	0	Y	88.4	164351	Y	0.0	0
19	164802	4TNC	Y	98.2	164712	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	164820	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	83.7	163820
19	164856	4TNC	Y	97.2	164828	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	165025	4TNC	Y	98.0	164957	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	165223	4LNC	Y	0.0	0	Y	0.0	0	Y	75.8	165302	Y	0.0	0
19	165403	3MND	Y	93.3	165333	Y	79.8	165247	Y	0.0	0	Y	86.9	165126
19	165527	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	165648	4LNC	Y	92.0	165625	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	165709	3FND	Y	79.2	165654	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	165800	4TNC	Y	99.5	165746	Y	0.0	0	Y	71.6	165857	Y	0.0	0
19	170024	3GND	Y	94.4	170009	Y	79.1	165836	Y	0.0	0	Y	0.0	0
19	170222	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	170240	3LND	Y	0.0	0	Y	77.5	170106	Y	0.0	0	Y	0.0	0
19	170505	4TNC	Y	96.9	170516	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	170614	4TNC	Y	98.7	170631	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	170717	4TNC	Y	99.2	170738	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	170900	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	171058	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	171220	4LNC	Y	0.0	0	Y	85.6	171131	Y	0.0	0	Y	0.0	0
19	171309	1TNA	Y	103.9	171401	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	171539	4TNC	Y	96.6	171627	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	171659	4TNC	Y	97.2	171748	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	171831	4TNC	Y	99.2	171913	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	172058	2GNA	Y	113.9	172145	Y	90.1	172040	Y	87.0	172052	Y	97.0	171912
19	172206	4GNC	Y	95.7	172307	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	172318	4LNC	Y	0.0	0	Y	71.3	172134	Y	0.0	0	Y	0.0	0
19	172429	4LNC	Y	0.0	0	Y	71.5	172141	Y	0.0	0	Y	0.0	0
19	172623	1TNB	Y	106.2	172619	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	172816	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	172948	4TNC	Y	97.5	172917	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	173110	4TNC	Y	98.9	173047	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	173206	4TNC	Y	98.1	173152	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	173354	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	173433	4TNC	Y	93.8	173431	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	173553	4LNC	Y	0.0	0	Y	85.2	173432	Y	0.0	0	Y	0.0	0
19	173653	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	173728	1GNB	Y	109.0	173753	Y	86.0	173621	Y	0.0	0	Y	95.0	173515
19	173905	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	174055	4TNC	Y	90.3	174105	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	174219	4TNC	Y	95.8	174217	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	174400	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	174515	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	174255
19	174913	4TNC	Y	97.9	174952	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	174949	1MNF	Y	0.0	0	Y	89.7	174940	Y	76.6	175001	Y	92.0	174626
19	175237	1GNB	Y	108.9	175334	Y	89.7	175409	Y	0.0	0	Y	85.4	174834
19	175443	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
19	180428	1GNB	Y	107.9	180525	Y	84.1	180401	Y	0.0	0	Y	95.1	180250
19	181649	1GNB	Y	110.4	181740	Y	89.5	181621	Y	74.8	181652	Y	93.4	181505
19	183001	1LNE	Y	0.0	0	Y	87.6	182737	Y	78.5	182752	Y	84.1	182633
19	183224	1GNB	Y	109.8	183149	Y	87.6	183026	Y	0.0	0	Y	88.2	182912

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
19	183619	2R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
19	184448	1GNB	Y	109.7	184414	Y	89.3	184246	Y	0.0	0	Y	96.6	184141
19	185433	2GNB	Y	112.0	185400	Y	91.8	185311	Y	88.9	185310	Y	98.8	185143
19	185751	1GNB	Y	105.8	185719	Y	87.5	185543	Y	78.3	185603	Y	97.3	185440
19	190609	2GNB	Y	112.8	190541	Y	90.8	190439	Y	87.6	190454	Y	103.3	190316
19	191007	1GNB	Y	106.3	190938	Y	85.7	190805	Y	73.7	190833	Y	98.0	190650
19	192045	3FNB	Y	90.5	192012	Y	78.4	191918	Y	79.8	191939	Y	89.8	191810
19	192405	1GNB	Y	105.2	192351	Y	85.5	192220	Y	73.3	192240	Y	88.7	192110
19	192719	9LNE	Y	0.0	0	Y	84.8	192544	Y	0.0	0	Y	90.0	192439
19	193159	3FNB	Y	87.6	193202	Y	81.1	193046	Y	77.2	193102	Y	88.5	192929
19	193628	1LNB	Y	0.0	0	Y	87.6	193514	Y	72.9	193529	Y	96.8	193341
19	194[illegible]0	3FNA	Y	97.2	194238	Y	79.1	194144	Y	71.8	194156	Y	88.3	194022
19	0	X	N	0.0	0	N	88.4	194851	N	0.0	0	N	0.0	0
19	195530	1TNA	Y	104.3	195540	Y	82.5	194945	Y	71.2	195016	Y	0.0	0
20	80200	1MNF	Y	79.7	80106	Y	84.2	80018	Y	0.0	0	Y	86.7	75920
20	80410	1FNC	Y	97.7	80340	Y	0.0	0	Y	97.9	80805	Y	0.0	0
20	80840	1FNF	Y	0.0	0	Y	80.4	80720	Y	0.0	0	Y	0.0	0
20	80945	1GNB	Y	108.8	80916	Y	0.0	0	Y	0.0	0	Y	93.1	80606
20	81133	1GNC	Y	106.6	81113	Y	0.0	0	Y	82.6	81121	Y	0.0	0
20	81257	4TNA	Y	97.9	81240	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	81411	4LNE	Y	94.8	81400	Y	70.9	81243	Y	0.0	0	Y	81.9	80958
20	81634	3TNA	Y	102.8	81604	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	0	X	N	82.3	81710	N	0.0	0	N	0.0	0	N	0.0	0
20	81747	1GNC	Y	107.6	81753	Y	80.7	81636	Y	81.2	81549	Y	0.0	0
20	0	X	N	78.4	81923	N	0.0	0	N	0.0	0	N	0.0	0
20	82026	3TNA	Y	109.0	82003	Y	80.6	82012	Y	0.0	0	Y	0.0	0
20	82133	1FNF	Y	88.6	82040	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	82249	1GNC	Pr	110.1	82301	Y	89.1	82146	Y	0.0	0	Y	0.0	0
20	82413	1GNB	Pr	110.1	82301	Y	0.0	0	Y	0.0	0	Y	86.8	81926
20	0	X	N	88.2	82631	N	0.0	0	N	0.0	0	N	0.0	0
20	0	X	N	85.8	82755	N	0.0	0	N	0.0	0	N	0.0	0
20	82931	1GNC	Y	106.3	82926	Y	74.5	82825	Y	0.0	0	Y	0.0	0
20	0	X	N	85.7	83136	N	0.0	0	N	0.0	0	N	0.0	0
20	0	X	N	78.7	83159	N	0.0	0	N	0.0	0	N	0.0	0
20	0	X	N	75.7	83232	N	0.0	0	N	0.0	0	N	0.0	0
20	83500	1FNC	Y	94.6	83437	Y	98.3	83336	Y	83.4	83346	Y	0.0	0
20	0	X	N	83.1	83603	N	0.0	0	N	0.0	0	N	0.0	0
20	83727	3GNA	Pr	110.4	83634	Y	82.8	83635	Y	0.0	0	Y	93.7	83525
20	84038	1LNC	Y	0.0	83634	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	84140	4MNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	85.4	83924
20	84308	2TNA	Y	113.4	84230	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	84445	4GNB	Y	0.0	84230	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	84744	4TNB	Y	0.0	85219	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	85052	1GNB	Y	0.0	85219	Y	81.3	84912	Y	0.0	0	Y	92.7	84815
20	85259	2TNA	Y	112.9	85219	Y	81.5	85237	Y	0.0	0	Y	0.0	0
20	85354	4LNB	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	0	X	N	81.8	85541	N	0.0	0	N	0.0	0	N	0.0	0
20	0	X	N	84.8	85644	N	0.0	0	N	0.0	0	N	0.0	0
20	85822	4FNB	Y	95.1	85802	Y	72.9	85709	Y	0.0	0	Y	87.9	85614
20	90107	1TNB	Y	102.6	90044	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	90312	3LNE	Y	0.0	0	Y	89.8	91110	Y	89.7	90127	Y	92.9	90145
20	90408	1FNF	Y	0.0	0	Y	80.9	90254	Y	0.0	0	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
20	90630	1GNB	Y	107.8	90638	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	90919	2TNA	Pr	118.8	90851	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	90919	2TNA	Pr	118.8	90851	Y	72.9	91011	Y	0.0	0	Y	0.0	0
20	91118	4GNB	Y	102.6	91119	Y	0.0	0	Y	0.0	0	Y	84.0	90917
20	91237	1GNC	Y	106.2	91240	Y	88.4	91128	Y	89.0	91137	Y	0.0	0
20	91444	4TNA	Y	98.0	91456	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	91819	2TNA	Y	115.3	91758	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	91916	1GNB	Y	107.3	91929	Y	0.0	0	Y	80.7	91828	Y	0.0	0
20	92137	ULNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	92418	1GNB	Y	108.2	92330	Y	85.5	92202	Y	0.0	0	Y	95.8	92105
20	0	X	N	97.9	92634	N	72.5	92534	N	0.0	0	N	86.8	92434
20	0	X	N	77.1	92755	N	71.0	92954	N	0.0	0	N	0.0	0
20	93246	1GNB	Y	106.6	93214	Y	86.5	93054	Y	0.0	0	Y	88.5	92932
20	93839	1GNB	Y	108.7	93801	Y	87.8	93650	Y	0.0	0	Y	80.3	93554
20	94142	4GNB	Y	98.9	94112	Y	0.0	0	Y	0.0	0	Y	87.2	93908
20	94524	1MNC	Y	101.9	94455	Y	83.5	94341	Y	0.0	0	Y	93.2	94232
20	0	X	N	78.4	94707	N	0.0	0	N	0.0	0	N	0.0	0
20	95009	1LNC	Y	92.2	94929	Y	86.9	94847	Y	70.8	95046	Y	0.0	0
20	95202	1MNC	Y	109.8	95153	Y	91.7	95035	Y	0.0	0	Y	94.6	94921
20	95609	4GNB	Y	99.1	95556	Y	75.8	95448	Y	0.0	0	Y	85.6	95352
20	0	X	N	78.6	95710	N	0.0	0	N	0.0	0	N	0.0	0
20	0	X	N	83.2	95813	N	0.0	0	N	0.0	0	N	0.0	0
20	100001	4TNA	Y	100.0	95938	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	101020	4LNB	Y	0.0	0	Y	78.6	100901	Y	78.4	100600	Y	82.9	100759
20	101324	3FNH	Y	86.8	101314	Y	75.5	101228	Y	0.0	0	Y	87.6	101127
20	101506	UTNH	Y	98.5	101520	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	101928	4TNA	Y	97.9	101919	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	102436	3FNB	Y	94.7	102429	Y	78.8	102346	Y	78.2	102414	Y	86.1	102243
20	102722	3TNA	Y	106.9	102722	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	102943	4LNE	Y	90.9	102953	Y	74.9	102855	Y	0.0	0	Y	85.7	102801
20	102943	X	N	85.9	103245	N	0.0	0	N	0.0	0	N	0.0	0
20	0	X	N	77.0	103315	N	0.0	0	N	0.0	0	N	0.0	0
20	110124	1TNA	Y	104.3	110040	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	113351	X	N	87.6	111820	N	0.0	0	N	0.0	0	N	0.0	0
20	113351	X	N	84.3	111848	N	0.0	0	N	0.0	0	N	0.0	0
20	113351	X	N	83.7	111920	N	0.0	0	N	0.0	0	N	0.0	0
20	113351	1TSH	Y	84.0	112010	Y	94.1	113423	Y	88.4	113503	Y	80.8	113555
20	113351	X	N	78.8	112349	N	0.0	0	N	0.0	0	N	0.0	0
20	113351	X	N	83.1	112415	N	0.0	0	N	0.0	0	N	0.0	0
20	113351	X	N	82.0	112502	N	0.0	0	N	0.0	0	N	0.0	0
20	114817	4TNA	Y	96.6	114730	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	120519	1TNA	Y	105.2	120418	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	121751	1TNB	Y	104.0	121735	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	123002	1GNB	Y	108.6	122937	Y	86.4	122819	Y	0.0	0	Y	94.4	122710
20	124148	1FNB	Y	99.6	124141	Y	82.7	124040	Y	0.0	0	Y	91.5	123931
20	124512	1GNB	Y	108.6	124454	Y	84.1	124348	Y	0.0	0	Y	94.8	124247
20	125354	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
20	125608	1GNB	Y	107.6	125628	Y	76.3	125532	Y	0.0	0	Y	96.4	125416
20	125918	1GNB	Y	108.6	125931	Y	84.3	125815	Y	0.0	0	Y	94.1	125717
20	130252	ULNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	130723	1MNF	Y	0.0	0	Y	90.5	130652	Y	0.0	0	Y	93.4	130549
20	130803	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
20	130920	UTSA	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	131034	1GNC	Y	107.5	131025	Y	78.0	131007	Y	0.0	0	Y	0.0	0
20	131240	1GNB	Y	111.2	131331	Y	84.6	131229	Y	0.0	0	Y	71.7	130949
20	131429	1GNB	Y	106.8	131519	Y	84.3	131410	Y	0.0	0	Y	93.6	131120
20	131647	8LNE	Y	0.0	0	Y	72.1	131659	Y	0.0	0	Y	81.5	131539
20	132613	1GNB	Y	110.1	132740	Y	83.7	132629	Y	0.0	0	Y	93.5	132529
20	132952	1GNB	Y	111.7	133052	Y	85.2	132935	Y	0.0	0	Y	95.4	132829
20	133147	2TNA	Y	116.1	133310	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	133645	2FNA	Y	95.4	133810	Y	91.0	133755	Y	85.7	133823	Y	84.7	133404
20	134119	1GNB	Y	106.9	134301	Y	84.5	134156	Y	0.0	0	Y	101.7	133717
20	134513	1MNC	Y	106.1	134656	Y	84.0	134540	Y	0.0	0	Y	87.9	134047
20	134655	2TNA	Y	113.1	134834	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	134853	4GNB	Y	96.4	135045	Y	0.0	0	Y	0.0	0	Y	88.3	134426
20	135057	2LNE	Y	0.0	0	Y	72.5	134929	Y	0.0	0	Y	84.7	134819
20	135429	1LNC	Y	0.0	0	Y	97.7	135343	Y	90.1	135358	Y	0.0	0
20	0	X	N	80.6	135532	N	0.0	0	N	0.0	0	N	97.6	135126
20	135739	ULNE	Y	0.0	0	Y	81.2	135611	Y	0.0	0	Y	90.0	135515
20	135849	1R	N	0.0	0	Y	74.3	135835	N	0.0	0	N	0.0	0
20	140002	1GNB	Y	107.3	135943	Y	0.0	0	Y	0.0	0	Y	92.0	135723
20	140632	4GNB	Y	96.2	140614	Y	77.2	140505	Y	0.0	0	Y	0.0	0
20	141029	3FND	Y	88.7	141005	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	141207	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.0	141008
20	141224	3FND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	141321	3FND	Y	95.4	141312	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	141402	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
20	141510	1LNB	Y	88.6	141451	Y	77.4	141412	Y	0.0	0	Y	84.3	141349
20	141624	3FND	Y	78.8	141554	Y	80.7	141530	Y	0.0	0	Y	0.0	0
20	141652	1TNB	Y	102.5	141649	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	141802	ULNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	77.5	141750
20	141910	3GND	Y	92.4	141834	Y	71.9	141911	Y	0.0	0	Y	0.0	0
20	141954	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	72.8	141812
20	142027	3FND	Y	78.7	142006	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	142106	4GNC	Y	78.9	142109	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	142220	1LNE	Y	0.0	0	Y	86.0	142153	Y	0.0	0	Y	83.9	142052
20	142237	3FND	Y	96.0	142157	Y	76.6	142254	Y	0.0	0	Y	0.0	0
20	142307	UTSA	Y	79.8	142300	Y	0.0	0	Y	0.0	0	Y	80.0	142422
20	142400	3GND	Y	96.2	142457	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	142715	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	142746	3FND	Y	91.8	142709	Y	80.2	142750	Y	0.0	0	Y	0.0	0
20	142925	1GNB	Y	108.7	142900	Y	76.9	142916	Y	0.0	0	Y	91.9	142644
20	143025	3FND	Y	0.0	0	Y	0.0	0	Y	81.1	142944	Y	0.0	0
20	143159	3FND	Y	86.9	143103	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	143230	3LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	143312	1TNB	Y	101.2	143257	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	143352	3MNG	Y	0.0	0	Y	72.3	143315	Y	0.0	0	Y	88.6	143100
20	143513	3LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	144043	1GNB	Y	105.4	144056	Y	84.5	143936	Y	0.0	0	Y	80.1	143841
20	0	X	N	80.5	144510	N	0.0	0	N	0.0	0	N	0.0	0
20	144527	1GNB	Y	106.6	144552	Y	87.0	144439	Y	73.8	144234	Y	95.5	144328
20	0	X	N	106.2	145317	N	77.6	145200	N	0.0	0	N	97.0	145048
20	0	X	N	79.8	145710	N	0.0	0	N	0.0	0	N	92.5	145600
20	0	X	N	105.3	145825	Y	82.5	145707	N	0.0	0	N	88.9	145733

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
20	150520	1MMF	Y	0.0	0	Y	81.8	150307	Y	0.0	0	Y	86.4	150156
20	150820	1GMC	Y	103.6	150718	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	151058	1GMB	Y	106.0	151121	Y	89.3	151008	Y	0.0	151136	Y	91.1	150900
20	151237	1GMC	Y	105.5	151247	Y	94.4	151258	Y	104.9	151327	Y	0.0	0
20	151425	4TMB	Y	96.7	151508	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	151618	2FMB	Y	94.4	151636	Y	87.4	151612	Y	82.9	151633	Y	93.2	151235
20	151721	1GMB	Y	109.0	151816	Y	97.5	151701	Y	79.5	151717	Y	85.9	151529
20	151838	2MMD	Y	82.3	151858	Y	90.5	151856	Y	0.0	0	Y	84.8	151842
20	152023	2GMD	Y	111.4	152050	Y	78.7	152038	Y	86.3	151926	Y	0.0	0
20	152125	7LME	Y	0.0	0	Y	78.1	152133	Y	0.0	0	Y	83.4	152039
20	152155	2FMD	Th	86.1	152222	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	152155	2FMD	Th	86.1	152222	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	152155	2FMD	Th	86.1	152222	Y	78.1	152133	Y	0.0	0	Y	0.0	0
20	152310	2GMD	Th	104.7	152333	Pr	101.1	152223	Pr	92.2	152248	Y	0.0	0
20	152327	2GMD	Th	104.7	152333	Pr	101.1	152223	Pr	92.2	152248	Y	0.0	0
20	152346	2GMD	Th	104.7	152333	Y	86.7	152255	Y	78.5	152332	Y	0.0	152317
20	152518	2FMD	Fr	108.5	152549	Y	77.1	152353	Y	0.0	0	Y	0.0	0
20	152518	2FMD	Fr	108.5	152549	Y	75.9	152403	Y	0.0	0	Y	0.0	0
20	152518	2FMD	Fr	108.5	152549	Y	84.8	152422	Y	0.0	0	Y	0.0	0
20	152613	2MMD	Fr	108.5	152549	Y	97.5	152556	Y	99.1	152613	Y	96.9	152608
20	152653	2LMD	Y	81.9	152629	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	152658	2FMD	Y	105.8	152710	Pr	87.7	152655	Pr	84.5	152706	Y	0.0	0
20	152658	2FMD	Y	112.6	152800	Pr	87.7	152655	Pr	84.5	152706	Y	0.0	0
20	152751	2LMD	Y	0.0	0	Y	88.2	152755	Y	83.3	152823	Y	0.0	0
20	153304	1GMB	Y	107.0	153224	Y	85.4	152941	Y	83.8	153042	Y	94.6	152944
20	153459	2LMD	Y	0.0	0	Y	85.7	153349	Y	73.2	153401	Y	0.0	0
20	153459	2LMD	Y	80.9	153612	Y	80.4	153554	Y	77.1	153411	Y	0.0	153309
20	153725	3MMD	Y	99.4	153643	Y	71.9	153816	Y	0.0	0	Y	89.3	153448
20	154008	3LMD	Y	0.0	0	Y	84.3	153945	Y	75.8	153848	Y	0.0	0
20	154104	1FMB	Y	96.9	154034	Y	0.0	0	Y	0.0	0	Y	86.5	153824
20	154320	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
20	154628	1FMB	Y	98.5	154618	Y	84.7	154516	Y	0.0	0	Y	87.8	154400
20	155233	1MMC	Y	109.9	155225	N	0.0	0	Y	0.0	0	Y	90.6	154958
20	155557	4LME	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	87.7	155352
20	155727	1FMC	Y	88.7	155721	N	81.7	0	Y	0.0	0	Y	0.0	0
20	0	X	N	105.7	155829	N	0.0	0	N	0.0	0	N	0.0	0
20	160010	1GMB	Y	106.4	160010	N	0.0	0	Y	0.0	0	Y	80.9	155609
20	160032	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	81.1	160334
20	160133	1LMC	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
20	161238	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
20	161328	1MMF	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	92.5	161204
20	161633	1LMF	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
20	163457	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	74.1	162842
20	171458	X	N	80.6	170448	N	0.0	0	N	0.0	0	N	72.1	163117
20	171458	4TSH	Y	90.7	170823	N	0.0	0	Y	0.0	0	Y	84.1	171848
20	171458	X	N	80.3	171326	N	0.0	0	N	0.0	0	N	0.0	0
20	171458	X	N	79.9	171412	N	0.0	0	N	0.0	0	N	0.0	0
20	171948	8LSE	Y	100.2	171941	N	0.0	0	Y	0.0	0	Y	0.0	0
20	0	X	N	82.2	172224	N	0.0	0	N	0.0	0	N	0.0	0
20	174949	2FMB	Y	101.8	175034	N	0.0	0	Y	87.0	175042	Y	98.1	174935
20	180056	2MMD	Y	111.9	180139	Y	90.7	180119	Y	87.7	180144	Y	89.8	180042
20	180339	2LMD	Y	76.4	180906	Y	95.3	180356	Y	83.2	180428	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	ACRT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
20	0	X	N	78.4	182133	N	74.1	180649	N	0.0	0	N	0.0	0
20	0	X	N	82.5	182352	N	0.0	0	N	0.0	0	N	0.0	0
20	182438	1LNE	N	90.3	182546	Y	83.3	182453	Y	0.0	0	Y	90.1	182347
20	182438	X	N	77.9	183010	N	0.0	0	N	0.0	0	N	0.0	0
20	182438	X	N	77.3	183031	N	0.0	0	N	0.0	0	N	0.0	0
20	182438	X	N	79.1	183045	N	0.0	0	N	0.0	0	N	0.0	0
20	182628	1TNA	Y	106.0	182816	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	183227	1TNA	Y	112.3	183205	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	183450	4TNA	Y	98.4	183422	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	0	X	N	81.6	183658	N	0.0	0	N	0.0	0	N	0.0	0
20	183739	1TNC	Y	106.4	183727	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	184232	1GNC	Y	110.7	184238	Y	92.5	184127	Y	92.5	184139	Y	0.0	0
20	184500	4LNE	Y	88.1	184441	Y	77.2	184402	Y	0.0	0	Y	79.5	184312
20	184849	1FNB	Y	101.2	184901	Y	74.1	184755	Y	0.0	0	Y	85.8	184713
20	185049	8TNA	Y	91.4	185048	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	185523	1GNA	Y	111.7	185540	Y	83.0	185430	Y	0.0	0	Y	92.9	185327
20	190204	1GNB	Y	111.1	190226	Y	81.9	190101	Y	0.0	0	Y	92.9	190005
20	190830	1GNB	Y	109.3	190858	Y	83.7	190735	Y	0.0	0	Y	92.9	190641
20	191650	1MNF	Y	0.0	0	Y	81.4	191635	Y	0.0	0	Y	92.2	191532
20	191951	1FNC	Y	96.2	192024	Y	0.0	0	Y	0.0	0	Y	0.0	0
20	192312	1GNB	Y	111.5	192352	Y	85.1	192238	Y	71.9	192304	Y	91.3	192142
20	192451	1GNB	Y	111.8	192537	Y	95.5	192430	Y	82.2	192446	Y	85.0	192851
20	193027	4GNC	Y	97.6	193121	Y	72.7	192955	Y	0.0	0	Y	0.0	0
20	193453	4GNB	Y	96.9	193608	Y	0.0	0	Y	0.0	0	Y	73.2	193137
20	193731	1GNB	Y	108.3	193842	Y	80.7	193746	Y	0.0	0	Y	76.0	193635
20	194052	1GNA	Y	109.4	194215	Y	83.2	194052	Y	0.0	0	Y	91.9	193950
20	0	X	N	78.9	194541	N	78.9	194737	N	0.0	0	N	0.0	0
20	194835	4GNB	Y	94.0	195003	Y	80.3	194850	Y	76.0	194816	Y	70.4	194735
20	195306	1GNB	Y	107.3	195434	Y	83.3	195321	Y	0.0	0	Y	92.8	195222
20	195519	1GNB	Y	110.9	195656	Y	88.2	195534	Y	0.0	0	Y	88.6	195439
21	85404	1TNA	Y	109.2	85355	N	0.0	0	Y	0.0	0	Y	0.0	0
21	90520	4TNA	Y	100.3	90508	N	0.0	0	Y	0.0	0	Y	0.0	0
21	92811	UR	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
21	93419	UR	Y	0.0	0	N	0.0	0	Y	0.0	0	N	0.0	0
21	94134	UTNA	Y	112.3	94125	N	0.0	0	Y	0.0	0	N	0.0	0
21	94503	9LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
21	94724	4TNA	Y	97.8	94727	N	0.0	0	Y	0.0	0	Y	84.7	94246
21	95314	8TNA	Y	89.3	95316	N	0.0	0	Y	0.0	0	Y	0.0	0
21	95926	1TNA	Y	110.1	95946	N	0.0	0	Y	0.0	0	Y	0.0	95423
21	100239	1TNA	Y	106.0	100323	N	0.0	0	Y	0.0	0	Y	0.0	0
21	101140	UFNH	Y	97.8	101217	N	0.0	0	Y	0.0	0	Y	0.0	0
21	101855	3TNA	Y	106.2	101926	N	0.0	0	Y	0.0	0	Y	84.1	100927
21	102315	3TNA	Y	107.4	102352	N	0.0	0	Y	0.0	0	Y	0.0	0
21	103956	2TNA	Y	114.5	104034	N	0.0	0	Y	71.7	102425	Y	0.0	0
21	105547	2TNA	Fr	121.3	105626	N	0.0	0	Y	77.0	104202	Y	0.0	0
21	105547	2TNA	Fr	121.3	105626	N	0.0	0	Fr	87.8	105754	Y	0.0	0
21	105547	2TNA	Fr	121.3	105626	N	0.0	0	Fr	87.8	105754	Y	0.0	0
21	105547	2TNA	Fr	121.3	105626	N	0.0	0	Fr	87.8	105754	Y	0.0	0
21	110311	1R	N	0.0	0	N	0.0	0	Fr	87.8	105754	Y	0.0	0
21	110426	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
21	110603	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
21	0	X	N	78.1	111023	N	0.0	0	N	0.0	0	N	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
21	112532	1LNE	Y	0.0	0	N	0.0	0	Y	71.5	112419	Y	87.1	112224
21	112914	2TNA	Y	109.7	112839	N	0.0	0	Y	0.0	0	Y	0.0	0
21	0	X	N	88.4	112915	N	0.0	0	N	0.0	0	N	0.0	0
21	113122	2TNA	Y	114.8	113051	N	0.0	0	Y	0.0	0	Y	80.2	113137
21	113848	4MNF	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	85.0	113610
21	114118	4FNB	Y	92.5	114112	N	0.0	0	Y	0.0	0	Y	0.0	0
21	114327	1TNA	Y	98.5	114320	N	0.0	0	Y	0.0	0	Y	0.0	0
21	115437	4LNB	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	86.5	115213
21	115817	1TNA	Y	104.3	115807	N	0.0	0	Y	0.0	0	Y	0.0	0
21	120018	4TNA	Y	96.2	120021	N	0.0	0	Y	0.0	0	Y	0.0	0
21	120832	ULNE	Y	0.0	0	N	0.0	0	Y	88.0	120852	Y	94.1	115528
21	120935	2MND	Y	93.3	120846	N	0.0	0	Y	0.0	0	Y	93.0	120741
21	121157	2FND	Y	104.7	121043	N	0.0	0	Y	0.0	0	Y	0.0	0
21	121226	1MNC	Y	96.7	121254	N	0.0	0	Y	97.0	121213	Y	88.1	121022
21	121517	2LND	Y	0.0	0	N	0.0	0	Y	82.8	121412	Y	0.0	0
21	121643	8LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	85.1	121331
21	121818	1GNB	Y	104.0	121727	N	0.0	0	Y	0.0	0	Y	0.0	0
21	122518	UTNA	Y	95.2	122446	N	0.0	0	Y	0.0	0	Y	0.0	0
21	122518	X	N	80.3	122534	N	0.0	0	N	0.0	0	N	0.0	0
21	122726	2LNE	Y	0.0	0	N	0.0	0	Y	81.9	122558	Y	74.5	122523
21	122754	2LNE	Y	0.0	0	N	0.0	0	Pr	98.9	122748	Y	0.0	0
21	122824	2LNE	Y	0.0	0	N	0.0	0	Pr	98.9	122748	Y	0.0	0
21	122858	2LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
21	123107	1LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	95.2	122843
21	123244	1FNB	Y	0.0	123242	N	0.0	0	Y	72.5	123132	Y	83.1	123007
21	123400	2MND	Pr	113.8	123242	N	0.0	0	Y	84.2	123335	Y	93.9	123223
21	123544	2FND	Y	105.3	123552	N	0.0	0	Y	97.3	123542	Y	0.0	0
21	123602	3TNA	Pr	105.3	0	N	0.0	0	Y	0.0	0	Y	0.0	0
21	123721	2LND	Y	0.0	0	N	0.0	0	Y	79.6	123725	Y	0.0	0
21	124000	2TNA	Pr	117.7	123927	N	0.0	0	Y	0.0	0	Y	0.0	0
21	124000	2TNA	Pr	117.7	123927	N	0.0	0	Y	0.0	0	Y	0.0	0
21	124440	1MNC	Y	100.7	124406	N	0.0	0	Y	0.0	0	Y	89.7	124152
21	124928	1LNC	Y	0.0	0	N	0.0	0	Y	86.6	124754	Y	0.0	0
21	125533	3MND	Y	92.3	125441	N	0.0	0	Y	0.0	0	Y	86.9	125201
21	125741	4TNA	Y	96.4	125659	N	0.0	0	Y	0.0	0	Y	0.0	0
21	130726	3LND	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
21	130848	8GNH	Y	109.9	130844	N	0.0	0	Y	80.6	130751	Y	93.3	130601
21	131718	8TSH	Y	0.0	0	N	0.0	0	Y	75.5	131848	Y	81.9	131954
21	133159	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	83.1	131233
21	133217	4TNB	Y	93.4	133147	N	0.0	0	Y	0.0	0	Y	83.5	133055
21	133407	4LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	86.9	133122
21	133811	4GNC	Y	95.4	133804	N	0.0	0	Y	82.0	133654	Y	0.0	0
21	134319	4LNC	Y	0.0	0	N	0.0	0	Y	85.6	134248	Y	76.1	134155
21	134527	4TNC	Y	99.6	134514	N	0.0	0	Y	0.0	0	Y	0.0	134758
21	135200	4GNC	Y	95.9	135142	N	0.0	0	Y	0.0	0	Y	0.0	0
21	135453	1GNB	Y	107.4	135427	N	0.0	0	Y	0.0	0	Y	85.6	135208
21	135726	4LNC	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	135657
21	140647	1LNB	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	94.5	140351
21	141234	2TNA	Pr	119.6	141147	N	0.0	0	Y	0.0	0	Y	0.0	0
21	141234	2TNA	Pr	119.6	141147	N	0.0	0	Y	0.0	0	Y	0.0	0
21	142225	4TNA	Y	95.1	142152	N	0.0	0	Y	0.0	0	Y	0.0	0
21	142622	3MND	Y	92.5	142558	N	0.0	0	Y	0.0	0	Y	88.2	141617

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
21	142740	2TNA	Y	114.2	142704	N	0.0	0	Y	0.0	0	Y	0.0	0
21	142906	2LNE	Pr	77.0	142941	N	0.0	0	Pr	80.5	142811	Y	91.8	142704
21	142906	2LNE	Pr	77.0	142941	N	0.0	0	Pr	80.5	142811	Y	0.0	0
21	143127	3LND	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
21	143257	1TNA	Y	105.4	1432[illegible]3	.	0.0	0	Y	0.0	0	Y	0.0	0
21	143629	2TNA	Pr	114.[illegible]	1435[illegible]0	N	0.0	0	Y	0.0	0	Y	0.0	0
21	143629	2TNA	Pr	114.1	143550	N	0.0	0	Y	0.0	0	Y	0.0	0
21	145558	5MND	Y	117.6	145533	N	0.0	0	Y	0.0	0	Y	92.8	145543
21	145805	5LND	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
21	151500	1TNA	Y	105.3	151437	N	0.0	0	Y	0.0	0	Y	0.0	152610
21	154229	1MNF	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	94.0	153936
21	154[illegible]03	1FNB	Y	104.2	154419	N	0.0	0	Y	0.0	0	Y	84.5	154306
21	154929	1GNB	Y	108.5	154847	N	0.0	0	Y	78.9	154747	Y	90.0	154840
21	155035	2MND	Y	87.8	154934	N	0.0	0	Y	89.4	155002	Y	89.2	154956
21	155554	2LND	Y	0.0	0	N	0.0	0	Y	84.3	155444	Y	72.4	155401
21	155817	4TNA	Y	96.1	155743	N	0.0	0	Y	0.0	0	Y	0.0	0
21	160057	3MND	Y	83.3	155814	Y	0.0	0	Y	0.0	0	Y	84.4	155619
21	160057	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	82.0	155818
21	160230	3FND	Y	92.7	160142	Y	82.3	160237	Y	0.0	0	Y	0.0	0
21	160411	1GNB	Y	108.2	160400	Y	0.0	0	Y	0.0	0	Y	94.2	160140
21	160445	3FND	Y	0.0	160400	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	160600	3LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	79.8	160540
21	160738	5FND	Y	106.3	160717	Y	77.3	160649	Y	0.0	0	Y	0.0	0
21	160832	2MND	Pr	111.2	160844	Y	82.6	160719	Y	76.2	160745	Pr	88.4	160709
21	160850	2MND	Pr	111.2	160844	Y	79.2	160834	Y	71.2	160757	Pr	88.4	160709
21	0	2FND	N	88.0	160918	N	0.0	0	N	0.0	0	Y	78.5	160944
21	161130	5LND	Y	0.0	0	Y	102.0	161113	Y	98.9	161115	Y	0.0	0
21	161403	2FND	Y	0.0	0	Pr	86.7	161318	Pr	98.7	161346	Y	0.0	0
21	161403	2FND	Y	0.0	0	Pr	86.7	161318	Pr	98.7	161346	Y	0.0	0
21	161456	2LND	Y	0.0	0	Y	89.6	161401	Y	85.9	161427	Y	0.0	0
21	161520	2LND	Y	0.0	0	Y	86.5	161523	Y	71.7	161541	Y	0.0	0
21	161634	1FNB	Y	99.4	161716	Y	[illegible]4.8	161606	Y	79.0	161554	Y	93.9	161508
21	161832	3TNH	Y	105.5	161904	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	162033	2TNA	Th	119.1	162101	Y	0.0	0	Y	0.0	0	Y	71.9	161929
21	162033	2TNA	Th	119.1	162101	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	162033	2TNA	Th	119.1	162101	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	162257	3TNA	Y	101.1	162347	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	162900	1LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	94.1	162647
21	163655	1TNB	Y	104.1	163536	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	164755	1GNB	Y	107.6	164751	Y	82.9	164631	Y	0.0	0	Y	93.3	164527
21	165904	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.5	165631
21	170122	4TNA	Y	103.0	170113	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	170305	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	85.2	170056
21	170500	2TNA	Y	115.3	170450	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	0	X	N	80.7	170622	N	0.0	0	N	0.0	0	N	0.0	0
21	170653	1GNA	Y	107.9	170715	Y	83.6	170551	Y	0.0	0	Y	93.2	170449
21	171249	2MNG	Y	0.0	0	Y	81.3	171252	Y	0.0	0	Y	83.3	171244
21	171406	2LND	Y	0.0	0	Y	78.4	171358	Y	0.0	0	Y	80.8	171359
21	172023	1GNB	Y	107.2	172054	Y	84.8	171737	Y	76.9	172008	Y	93.8	171829
21	173201	1GNB	Y	107.0	173241	Y	85.1	173135	Y	0.0	0	Y	93.5	173021
21	173523	2LNE	Y	0.0	0	Y	87.9	173524	Y	91.9	173557	Y	96.6	173444
21	173823	2LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
21	174223	1MMF	Y	0.0	0	Y	75.1	174241	Y	0.0	0	Y	90.8	174128
21	174506	1FNB	Y	101.2	174618	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	174946	1LNE	Y	0.0	0	Y	83.9	174936	Y	0.0	0	Y	94.0	174821
21	175140	3FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	175148	2FND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	175255	3FND	Y	80.2	175241	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	175325	2FMD	Y	107.9	175441	Y	81.0	175240	Y	85.0	175436	Y	79.2	175225
21	175511	3FND	Y	79.6	175709	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	175542	2FND	Y	96.4	175535	Y	93.0	175416	Y	82.0	175634	Y	0.0	0
21	175542	1FNB	Pr	96.4	175535	Y	0.0	0	Y	0.0	175634	Y	92.9	175522
21	175618	3LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	175805	8LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	81.0	175747
21	175930	2FND	Y	99.0	175842	Y	96.1	175659	Y	102.2	175714	Y	0.0	0
21	180026	2LND	Y	0.0	0	Y	85.6	180106	Y	81.6	180123	Y	0.0	0
21	180500	1TNB	Y	104.5	180424	Y	0.0	0	Y	0.0	0	Y	0.0	0
21	180716	1GNB	Y	109.8	180951	Y	83.1	180830	Y	0.0	0	Y	92.9	180736
21	182216	1LNE	Y	0.0	0	Y	83.3	182329	Y	0.0	0	Y	92.1	182234
21	0	X	N	83.5	185740	N	0.0	0	N	0.0	0	N	0.0	0
21	190257	8TSH	Y	80.3	190102	Y	81.9	190351	Y	71.0	190440	Y	0.0	0
21	191220	4GNB	Y	94.3	191209	Y	0.0	0	Y	0.0	0	Y	86.8	190950
21	192405	4FNB	Y	94.7	192338	Y	0.0	0	Y	0.0	0	Y	79.7	192122
21	193553	4GNB	Y	95.7	193539	Y	0.0	0	Y	0.0	0	Y	84.1	193316
21	194812	4GNB	Y	97.3	194806	Y	0.0	0	Y	0.0	0	Y	85.4	194540
21	195927	4GNB	Y	96.8	195920	Y	0.0	0	Y	0.0	0	Y	85.2	195652
22	84139	1TSA	Y	0.0	0	Y	93.7	84258	Y	86.2	84339	Y	86.8	84432
22	90438	1LNE	Y	0.0	0	Y	80.9	90230	Y	0.0	0	Y	94.2	90109
22	91445	1TNA	Y	104.7	91429	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	101448	1LNE	Y	0.0	0	Y	82.3	101345	Y	0.0	0	Y	92.3	101219
22	103546	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
22	103719	7LNE	Y	0.0	0	Y	75.1	103638	Y	0.0	0	Y	78.3	103548
22	104947	3TNA	Y	105.7	104945	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	112000	7TSA	Y	0.0	0	Y	92.8	112048	Y	87.9	112133	Y	88.6	112238
22	112818	1LNE	Y	80.0	113450	Y	83.2	112745	Y	0.0	0	Y	84.2	112649
22	113843	1GNB	Y	102.2	113926	Y	85.7	113801	Y	0.0	0	Y	92.3	113655
22	115133	1GNB	Y	104.0	115221	Y	85.5	115054	Y	71.2	115101	Y	92.5	114936
22	115334	3TNA	Y	101.9	115408	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	0	X	N	76.2	120125	N	0.0	0	N	0.0	0	N	0.0	0
22	0	X	N	79.3	120141	N	0.0	0	N	0.0	0	N	0.0	0
22	0	X	N	84.0	120227	N	0.0	0	N	0.0	0	N	0.0	0
22	120339	3TNA	Y	103.7	120453	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	120544	1LNB	Y	78.6	121149	Y	86.9	120544	Y	0.0	0	Y	94.4	120427
22	0	X	N	81.4	121317	N	0.0	0	N	0.0	0	N	79.3	120728
22	0	X	N	81.5	121708	N	0.0	0	N	0.0	0	N	73.5	120919
22	122009	3MND	Y	84.8	121946	Y	0.0	0	Y	0.0	0	Y	76.5	121637
22	122100	3FND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	122338	3GND	Y	90.1	122327	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	122436	3FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	122545	3GND	Y	89.0	122542	Y	86.0	122359	Y	84.8	122419	Y	76.3	122331
22	122619	3LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	122733	3GND	Y	95.4	122752	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	123013	3GND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	123040	3FND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
22	123218	3GND	Y	90.7	123243	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	123255	3FND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	123454	3GND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.7	123420
22	123702	3GND	Y	94.6	123725	Y	0.0	0	Y	0.0	0	Y	76.9	123500
22	123918	3LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	124136	UFND	Y	84.9	124256	Y	73.8	124052	Y	0.0	0	Y	79.2	123919
22	124417	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.0	124225
22	124613	2TNA	Y	117.6	124635	Y	77.5	124659	Y	0.0	0	Y	0.0	0
22	124835	8LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	79.9	124606
22	124916	3TNB	Y	99.2	124955	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	125029	9MND	Y	102.7	125105	Y	76.1	125042	Y	0.0	0	Y	90.7	124951
22	125137	3FNB	Y	96.4	125221	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	125209	9FND	Y	101.4	125303	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	125351	9FND	Y	92.6	125454	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	125554	9LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	125938	UFNA	Y	83.4	130134	Y	76.4	125941	Y	0.0	0	Y	76.0	125749
22	130846	3FNB	Y	0.0	0	Y	78.0	130839	Y	0.0	0	Y	86.6	130717
22	131104	3TNH	Y	103.4	131245	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	131425	4TNA	Th	103.4	131413	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	131445	4TNA	Th	103.4	131413	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	131500	4TNA	Th	103.4	131413	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	131800	1TNA	Y	105.8	131716	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	132800	3MND	Y	96.2	132743	Y	0.0	0	Y	0.0	0	Y	84.2	132457
22	133040	3FND	Y	94.1	132953	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	0	X	N	78.7	133140	N	0.0	0	N	0.0	0	N	0.0	0
22	0	X	N	89.5	133200	N	0.0	0	N	0.0	0	N	86.1	132935
22	133610	2LNE	Y	85.0	133611	Y	84.6	133457	Y	72.3	133528	Y	91.5	133322
22	133705	3MND	Y	94.1	133818	Y	0.0	0	Y	0.0	0	Y	91.0	133411
22	133900	3FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	134000	3FND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	134130	2TNA	Fr	120.7	134056	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	134130	2TNA	Fr	120.7	134056	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	134140	5TNA	Fr	120.7	134056	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	134140	5TNA	Fr	120.7	134056	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	134305	3FND	Y	95.1	134216	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	134500	3FND	Y	92.9	134510	Y	76.7	134422	Y	94.1	134637	Y	0.0	0
22	134709	3FND	Y	94.3	134719	Y	0.0	0	Y	90.3	135110	Y	0.0	0
22	134912	3FND	Y	92.2	134932	Y	94.3	134917	Y	80.8	135234	Y	0.0	0
22	134912	3LNE	Y	0.0	0	Y	80.8	135208	Y	85.0	135313	Y	89.7	134557
22	135319	3LND	Y	0.0	0	Y	84.4	135657	Y	84.9	135546	Y	0.0	0
22	140600	8TSH	Y	0.0	0	Y	83.4	140413	Y	73.5	140457	Y	85.2	140606
22	140927	3TNA	Y	101.5	141005	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	142806	1TNA	Y	103.9	142738	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	0	X	N	82.9	144259	N	0.0	0	N	0.0	0	N	87.4	141104
22	145103	2TNA	Y	112.8	145022	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	150208	1GNB	Y	107.7	150136	Y	82.5	150012	Y	0.0	0	Y	92.6	145912
22	150246	3FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	150358	3LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	150744	2TNA	Pr	112.8	150719	Y	74.2	150517	Y	0.0	0	Y	0.0	0
22	150744	2TNA	Pr	112.8	150719	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	0	X	N	99.1	151557	N	75.8	151456	N	0.0	0	N	92.2	151405
22	0	X	N	108.6	151839	N	88.6	151817	N	81.4	151846	N	88.6	151741

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
22	0	X	N	99.8	152412	N	0.0	0	N	0.0	0	N	0.0	0
22	153500	2FNA	Y	108.6	152620	Y	83.4	152515	Y	0.0	0	Y	94.5	152358
22	0	X	N	110.7	153034	N	98.9	152759	N	93.0	152842	N	83.8	152730
22	153550	3TNH	Y	102.0	153548	Y	88.2	153007	N	83.7	153041	Y	0.0	0
22	153500	5FNB	Y	96.4	153734	Y	81.4	153226	Y	0.0	0	Y	81.8	152946
22	0	X	N	94.3	153833	N	84.2	153817	N	84.5	153849	N	0.0	0
22	153500	2FNA	Y	104.8	154005	Y	73.9	153854	Y	71.8	153905	Y	84.3	153953
22	0	X	N	99.5	154047	N	88.3	154119	N	0.0	0	N	81.7	154249
22	0	X	N	93.4	154128	N	86.8	154153	N	83.0	154153	N	78.1	154433
22	0	X	N	85.7	154158	N	0.0	0	N	82.3	154236	N	73.5	154635
22	0	X	N	92.3	154216	N	98.3	154244	N	89.4	154316	N	0.0	0
22	155025	3MND	Y	93.4	154929	Y	0.0	0	Y	0.0	0	Y	96.1	155034
22	155425	3FND	Y	94.1	155333	Y	80.6	155156	Y	82.4	155215	Y	0.0	0
22	155545	4TNA	Y	98.4	155502	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	155745	3MND	Y	85.9	155749	Y	0.0	0	Y	0.0	0	Y	81.9	155720
22	160905	1MNC	Y	102.8	160926	Y	79.9	160820	Y	0.0	0	Y	76.9	160522
22	161150	4TNA	Y	98.8	161238	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	162144	1LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	163649	3MND	Y	95.6	163527	Y	76.1	163449	Y	0.0	0	Y	87.4	163342
22	163848	3GND	Y	100.1	163737	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	164121	3LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	0	X	N	79.8	165425	N	0.0	0	N	72.7	165219	N	0.0	0
22	0	X	N	78.2	165500	N	0.0	0	N	0.0	0	N	0.0	0
22	0	X	N	78.2	170451	N	0.0	0	N	0.0	0	N	0.0	0
22	171030	4FNC	Y	77.7	171136	Y	85.5	170906	Y	74.8	170928	Y	0.0	0
22	171238	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	171458	1TNA	Y	108.5	171420	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	171654	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
22	171859	4FNC	Y	84.0	171807	Y	78.0	171756	Y	0.0	0	Y	0.0	0
22	172044	4FNC	Y	97.0	171948	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	0	X	N	91.9	172414	N	0.0	0	N	0.0	0	N	0.0	0
22	172741	4FNC	Y	95.5	172723	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	173003	X	N	84.2	172941	N	0.0	0	N	0.0	0	N	0.0	0
22	173003	4LNE	Y	89.0	173140	Y	0.0	0	Y	72.8	173104	Y	0.0	0
22	173453	4LNC	Y	84.7	173434	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	173453	X	N	77.7	173525	N	0.0	0	N	0.0	0	N	0.0	0
22	173620	4LNE	Y	91.8	173717	Y	0.0	0	Y	0.0	0	Y	84.4	173422
22	173828	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	174834	3LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	91.0	174710
22	0	X	N	82.3	175753	N	0.0	0	N	87.2	175718	N	0.0	0
22	175932	8LNE	Y	91.0	175908	Y	81.3	175706	Y	0.0	0	Y	0.0	0
22	175932	X	N	81.7	180108	N	0.0	0	N	0.0	0	N	0.0	0
22	175932	X	N	80.9	180731	N	0.0	0	N	0.0	0	N	0.0	0
22	181357	2MND	Y	106.3	181227	Y	86.8	181217	Y	81.5	181330	Y	95.2	181137
22	181604	2GND	Y	101.4	181445	Y	89.5	181426	Y	79.7	181459	Y	0.0	0
22	181804	2FND	Y	97.9	181641	Y	82.9	181634	Y	78.4	181547	Y	0.0	0
22	182031	2FND	Y	103.3	181914	Y	89.3	181857	Y	82.4	181927	Y	0.0	0
22	182258	2FND	Y	113.8	182145	Y	95.5	182126	Y	97.5	182145	Y	0.0	0
22	182512	2LND	Y	0.0	0	Y	95.9	182348	Y	84.8	182419	Y	0.0	0
22	185100	1TNA	Y	107.2	185015	Y	0.0	0	Y	0.0	0	Y	0.0	0
22	185948	X	N	91.5	185327	N	0.0	0	N	0.0	0	N	0.0	0
22	185948	X	N	77.7	185556	N	0.0	0	N	0.0	0	N	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
22	185948	X	N	84.6	185707	N	0.0	0	N	0.0	0	N	0.0	0
22	185948	8TSB	Y	101.3	190034	Y	76.3	190013	Y	0.0	0	Y	0.0	0
22	0	X	N	91.0	190317	N	0.0	0	N	0.0	0	N	0.0	0
22	191433	2FNB	Y	97.3	191336	Y	86.8	191315	Y	81.4	191340	Y	94.1	191240
22	191950	1GNB	Y	111.9	191909	Y	83.0	191808	Y	0.0	0	Y	92.7	191657
22	192315	2MND	Y	110.0	192208	Y	86.0	192157	Y	79.0	192224	Y	94.3	192120
22	192510	2FND	Y	100.4	192430	Y	84.1	192408	Y	0.0	0	Y	0.0	0
22	192655	2FND	Y	108.9	192609	Y	78.5	192558	Y	0.0	0	Y	0.0	0
22	192852	2LNE	Y	0.0	0	Y	87.4	192738	Y	76.3	192759	Y	95.7	192627
22	192916	2FND	Y	82.8	192812	Y	96.8	192812	Y	84.7	192844	Y	0.0	0
22	193036	2LND	Y	0.0	0	Y	91.1	192940	Y	79.3	193012	Y	0.0	0
22	193208	6LNE	Y	85.0	193304	Y	88.5	193108	Y	79.1	193126	Y	85.0	193001
22	19 208	X	N	79.4	193337	N	0.0	0	N	0.0	0	N	0.0	0
22	193501	1GNA	Y	109.7	193453	Y	83.4	193336	Y	0.0	0	Y	92.8	193240
22	194825	2GNA	Y	114.2	194822	Y	87.4	194715	Y	71.1	194740	Y	101.0	194604
22	0	X	N	109.0	200104	N	83.2	200004	N	0.0	0	N	93.8	195844
25	80200	1GNA	Y	109.8	80129	Y	84.0	80013	Y	0.0	0	Y	94.9	75927
25	81139	1GNA	Y	108.1	81143	Y	85.2	81023	Y	0.0	0	Y	93.1	80932
25	0	X	N	77.3	81556	N	0.0	0	N	0.0	0	N	0.0	0
25	81639	1FNB	Y	102.0	81637	Y	83.3	81547	Y	0.0	0	Y	95.5	81447
25	82527	1MNF	Y	0.0	0	Y	82.3	82457	Y	0.0	0	Y	93.8	82418
25	82845	1GNB	Y	107.3	82907	Y	0.0	0	Y	0.0	0	Y	93.6	82919
25	83045	1FNF	Y	77.0	83050	Y	77.7	83020	Y	0.0	0	Y	0.0	0
25	83354	1GNB	Y	108.7	83411	Y	0.0	0	Y	0.0	0	Y	0.0	0
25	83739	3TNA	Y	106.1	83754	Y	0.0	0	Y	0.0	0	Y	0.0	0
25	84021	1MNC	Y	99.7	84035	Y	85.2	83926	Y	0.0	0	Y	94.7	83833
25	84608	1GNC	Y	107.7	84547	Y	95.9	84423	Y	86.5	84437	Y	0.0	0
25	0	X	N	76.3	84709	N	0.0	0	N	0.0	0	N	0.0	0
25	84825	1GNB	Y	107.3	84759	Y	87.6	84646	Y	0.0	0	Y	83.9	84539
25	85413	1GNC	Y	106.7	85408	Y	95.9	85253	Y	84.6	85317	Y	0.0	0
25	85801	1MNC	Y	99.2	85803	Y	85.5	85654	Y	0.0	0	Y	94.9	85605
25	85924	1GNC	Y	107.3	85942	Y	89.0	85824	Y	88.7	85842	Y	0.0	0
25	90627	1GNC	Y	106.9	90600	Y	78.9	90439	Y	96.5	90457	Y	0.0	0
25	91004	1GNB	Y	107.0	91033	Y	86.3	90915	Y	0.0	0	Y	94.6	90819
25	0	X	N	84.2	91211	N	0.0	0	N	0.0	0	N	0.0	0
25	0	X	N	108.8	91254	N	0.0	0	N	0.0	0	N	0.0	0
25	92104	1GNB	Y	105.5	92028	Y	78.5	91908	Y	0.0	0	Y	92.4	91822
25	92551	1GNB	Y	104.5	92527	Y	86.9	92403	Y	0.0	0	Y	91.1	92303
25	93114	1LNB	Y	0.0	0	Y	96.6	92948	Y	78.5	93010	Y	86.6	93001
25	93155	1FNC	Y	97.1	93132	Y	72.7	93045	Y	0.0	0	Y	0.0	0
25	93728	1LNC	Y	0.0	0	Y	0.0	0	Y	71.1	93607	Y	0.0	0
25	100030	2TNA	Y	115.0	100026	Y	0.0	0	Y	0.0	0	Y	0.0	0
25	0	X	N	85.2	104104	N	0.0	0	N	0.0	0	N	74.4	100547
25	0	X	N	82.0	104235	N	0.0	0	N	0.0	0	N	71.5	101904
25	104608	2TNA	Fr	119.3	104630	Y	0.0	0	Y	0.0	0	Fr	88.8	105057
25	104608	2TNA	Fr	119.3	104630	Y	0.0	0	Y	0.0	0	Fr	88.8	105057
25	104645	5TNA	Fr	119.3	104630	Y	0.0	0	Y	0.0	0	Fr	88.8	105057
25	104645	5TNA	Fr	119.3	104630	Y	0.0	0	Y	0.0	0	Fr	88.8	105057
25	0	X	N	83.9	104801	N	0.0	0	N	0.0	0	N	82.5	105212
25	0	X	N	80.0	111048	N	0.0	0	N	0.0	0	N	94.9	105724
25	0	X	N	81.9	111630	N	0.0	0	N	0.0	0	N	81.9	105831
25	0	X	N	81.1	111839	N	0.0	0	N	0.0	0	N	80.4	110150

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
25	115543	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	82.7	110215
25	120947	4TNA	Y	97.9	120758	Y	0.0	0	Y	0.0	0	Y	0.0	110813
25	121243	1TNA	Y	105.2	121050	Y	0.0	0	Y	0.0	0	Y	0.0	110926
25	122238	1TNB	Y	105.3	122049	Y	86.7	122057	Y	81.6	122124	Y	0.0	111815
25	122324	2LNE	Y	0.0	0	Y	87.6	122138	Y	82.6	122153	Y	100.4	122029
25	122345	5MND	Y	79.3	122123	Y	0.0	0	Y	0.0	0	Y	90.1	122130
25	122420	2FND	Y	109.3	122255	Y	0.0	0	Y	0.0	0	Y	0.0	0
25	122441	2LND	Y	0.0	0	Y	74.2	122254	Y	0.0	0	Y	0.0	0
25	122519	5LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
25	122549	5LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
25	122732	2LND	Y	0.0	0	Y	88.5	122449	Y	76.8	122523	Y	0.0	0
25	123451	1FNB	Y	102.1	123311	Y	87.1	123203	Y	0.0	0	Y	94.5	123115
25	123630	1GNB	Y	108.7	123456	Y	84.6	123349	Y	0.0	0	Y	89.0	123259
25	123837	3LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	73.5	123532
25	0	X	N	77.8	124219	N	0.0	0	N	0.0	0	N	0.0	0
25	124422	1FNB	Y	104.2	124256	Y	87.5	124202	Y	77.8	124224	Y	93.7	124107
25	124657	1LNE	Y	85.5	124759	Y	86.2	124419	Y	0.0	0	Y	86.6	124320
25	125014	2TNA	Pr	108.6	124821	Pr	84.9	124909	Y	0.0	0	Y	0.0	0
25	125014	2TNA	Pr	108.6	124821	Pr	84.9	124909	Y	0.0	0	Y	0.0	0
25	125155	1FNA	Y	102.6	125017	Y	80.8	125012	Y	0.0	0	Y	94.9	124821
25	0	X	N	80.5	125440	N	0.0	0	N	0.0	0	N	0.0	0
25	125844	1FNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
25	130203	1GNA	Y	111.4	130006	Y	85.7	130251	Y	0.0	0	Y	95.4	125532
25	130503	1MNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	83.7	130217
25	130826	1GNB	Y	107.5	130624	Y	0.0	0	Y	0.0	0	Y	95.4	131100
25	131411	1GNB	Y	113.4	131310	Y	83.6	131155	Y	0.0	0	Y	84.9	131305
25	0	X	N	83.8	131831	N	80.3	131856	N	0.0	0	N	0.0	0
25	132115	1FNB	Y	99.7	131956	Y	85.4	132040	Y	73.2	132124	Y	91.8	131813
25	132802	1FNB	Y	97.1	132650	Y	0.0	0	Y	0.0	0	Y	89.3	132300
25	133354	1GNB	Y	106.4	133301	Y	84.8	133139	Y	0.0	0	Y	97.1	133059
25	134139	1LNB	Y	0.0	0	Y	84.5	133936	Y	0.0	0	Y	94.5	133848
25	134626	1GNA	Y	108.6	134548	Y	84.7	134428	Y	0.0	0	Y	95.2	134345
25	135600	1TNB	Y	106.8	135548	Y	0.0	0	Y	0.0	0	Y	0.0	0
25	0	X	N	76.4	140248	N	0.0	0	N	0.0	0	N	0.0	0
25	140915	1GNB	Y	111.3	140840	Y	84.5	140714	Y	0.0	0	Y	94.7	140629
25	0	X	N	77.3	141321	N	0.0	0	N	0.0	0	N	0.0	0
25	142152	1FNB	Y	92.9	142125	Y	84.0	142012	Y	0.0	0	Y	94.0	141917
25	142705	3LNE	Y	0.0	0	Y	74.9	142540	Y	0.0	0	Y	85.6	142445
25	0	X	N	77.0	143247	N	0.0	0	N	0.0	0	N	0.0	0
25	143330	1GNB	Y	110.1	143334	Y	86.0	143213	Y	0.0	0	Y	96.4	143123
25	144615	1GNB	Y	108.6	144623	Y	85.3	144508	Y	0.0	0	Y	95.1	144415
25	0	X	N	78.1	145014	N	0.0	0	N	73.3	145314	N	0.0	0
25	150028	1GNB	Y	109.4	150027	N	0.0	0	Y	0.0	0	Y	83.9	145807
25	0	X	N	78.3	151254	N	0.0	0	N	0.0	0	N	0.0	0
25	151338	1GNB	Y	110.1	151334	N	0.0	0	Y	0.0	0	Y	93.9	151123
25	151801	3TNA	Y	106.4	151622	N	0.0	0	Y	0.0	0	Y	0.0	0
25	152353	4TNA	Y	95.9	152240	N	0.0	0	Y	0.0	0	Y	0.0	0
25	0	X	N	81.7	152352	N	0.0	0	N	0.0	0	N	0.0	0
25	0	X	N	76.7	152443	N	0.0	0	N	0.0	0	N	0.0	0
25	152613	1GNB	Y	109.8	152522	N	0.0	0	Y	0.0	0	Y	93.9	152321
25	152945	2TNA	Pr	117.9	152838	N	0.0	0	Y	0.0	0	Y	0.0	0
25	153021	2TNA	Pr	117.9	152838	N	0.0	0	Y	0.0	0	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	ACRT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
25	153550	1GNB	Y	107.4	153505	N	0.0	0	Y	0.0	0	Y	93.5	153258
25	153942	1GNB	Y	110.9	153904	N	0.0	0	Y	0.0	0	Y	95.2	153656
25	154257	4TNA	Y	97.5	154207	N	0.0	0	Y	0.0	0	Y	0.0	0
25	154948	1GNB	Y	107.7	154901	N	0.0	0	Y	0.0	0	Y	94.1	154656
25	0	X	N	96.1	155215	N	0.0	0	N	0.0	0	N	96.0	155024
25	160208	1LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	94.8	155929
25	160518	1FNB	Y	101.0	160440	N	0.0	0	Y	0.0	0	Y	90.9	160253
25	160831	1LNE	Y	84.2	160756	N	0.0	0	Y	0.0	0	Y	92.8	160605
25	161538	4LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
25	161911	X	N	79.3	161817	N	0.0	0	N	0.0	0	N	0.0	0
25	161911	X	N	81.3	161911	N	0.0	0	N	0.0	0	N	0.0	0
25	161911	X	N	77.4	161936	N	0.0	0	N	0.0	0	N	0.0	0
25	161911	1LNB	Y	87.3	162052	N	0.0	0	Y	0.0	0	Y	94.7	161628
25	165806	2LNE	Y	80.5	165744	N	0.0	0	Y	78.8	165741	Y	93.5	165650
25	170112	2LNE	Y	81.8	170054	N	0.0	0	Y	76.3	170046	Y	93.9	165950
25	0	X	N	99.3	171506	N	0.0	0	N	0.0	0	N	84.9	171338
25	172121	8LNE	Y	89.9	172100	N	0.0	0	Y	0.0	0	Y	84.0	171921
25	172121	X	N	89.1	172240	N	0.0	0	N	0.0	0	N	0.0	0
25	172327	2LNE	Y	76.4	172329	N	0.0	0	Y	0.0	0	Y	85.6	172227
25	180534	X	N	83.1	180538	N	0.0	0	N	0.0	0	N	0.0	0
25	180534	2LNE	Y	84.5	180624	N	0.0	0	Y	76.1	180523	Y	90.5	180436
25	180926	2LNE	Y	0.0	0	N	0.0	0	Y	72.5	180917	Y	90.5	180826
25	0	X	N	79.5	181652	N	0.0	0	N	0.0	0	N	0.0	0
25	0	X	N	85.3	181925	N	0.0	0	N	0.0	0	N	0.0	0
25	0	X	N	79.6	181950	N	0.0	0	N	0.0	0	N	0.0	0
25	0	X	N	87.8	182056	N	0.0	0	N	0.0	0	N	0.0	0
25	182140	3LNE	Y	81.2	182209	N	0.0	0	Y	0.0	0	Y	77.9	181849
25	0	X	N	82.4	182302	N	0.0	0	N	0.0	0	N	0.0	0
25	0	X	N	85.0	182349	N	0.0	0	N	0.0	0	N	0.0	0
25	0	X	N	79.6	182627	N	0.0	0	N	0.0	0	N	0.0	0
25	0	X	N	101.5	183321	N	0.0	0	N	0.0	0	N	0.0	0
25	0	X	N	79.6	183954	N	0.0	0	N	0.0	0	N	0.0	0
25	184458	8TNA	Y	95.3	184338	N	0.0	0	Y	0.0	0	Y	0.0	0
25	185227	1TNB	Y	109.2	185118	N	0.0	0	Y	0.0	0	Y	0.0	0
25	185825	2TNA	Y	116.3	185705	N	0.0	0	Y	0.0	0	Y	0.0	0
25	190406	2R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
25	190625	1GNB	Y	114.1	190521	N	0.0	0	Y	73.0	190203	Y	92.8	190331
25	191756	1FNB	Y	101.0	191644	N	0.0	0	Y	0.0	0	Y	96.1	191516
25	192600	8LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
25	193008	1MMC	Y	111.4	192910	N	0.0	0	Y	0.0	0	Y	95.4	192725
25	193323	9LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	82.1	193130
25	193602	1FNC	Y	102.7	193413	N	0.0	0	Y	0.0	0	Y	0.0	0
25	193857	1GNB	Y	110.9	193820	N	0.0	0	Y	0.0	0	Y	88.6	194637
25	195025	1GNB	Y	110.5	194949	N	0.0	0	Y	75.3	194431	Y	94.8	194807
26	80321	1FNC	Y	101.7	80236	Y	74.9	80155	Y	0.0	0	Y	0.0	0
26	80423	1GNB	Y	112.7	80341	Y	82.9	80236	Y	0.0	0	Y	89.6	80142
26	80815	1GNA	Y	110.9	80732	Y	90.6	80624	Y	0.0	0	Y	0.0	0
26	81705	1FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	81719	1GNA	Y	109.7	81709	Y	83.6	81555	Y	0.0	0	Y	93.3	81512
26	82045	XGSB	N	79.9	82052	N	0.0	0	N	0.0	0	N	0.0	0
26	82424	1GNA	Y	111.5	82407	Y	85.4	82258	Y	0.0	0	Y	89.3	82220
26	82650	XGSB	N	0.0	0	N	0.0	0	N	0.0	0	N	82.7	82530

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
26	83103	1FSC	N	94.8	83034	Y	71.3	82940	Y	0.0	0	Y	0.0	0
26	83104	1LNE	Y	87.7	83241	Y	75.8	82948	Y	0.0	0	Y	85.7	82904
26	83321	3LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.1	83124
26	83529	1GSB	N	0.0	0	Y	0.0	0	N	0.0	0	Y	0.0	0
26	83621	1FNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	83953	1GNB	Y	111.1	84002	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	84443	6TSH	Y	0.0	0	Y	75.9	84616	Y	0.0	0	Y	88.9	85148
26	84638	1LNB	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	85129	1TSH	Y	0.0	0	Y	75.1	85221	Y	0.0	0	Y	0.0	0
26	85301	1FNC	Y	98.0	85317	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	85835	1GNC	Y	110.2	85902	Y	87.6	85747	Y	93.2	85808	Y	0.0	0
26	90229	1LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	90315	1FNB	Y	99.1	90337	Y	0.0	0	Y	0.0	0	Y	80.2	90205
26	90423	6LNE	Y	90.5	90518	Y	87.7	90358	Y	82.2	90422	Y	101.3	90317
26	90423	X	N	87.6	90644	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	81.3	90934	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	84.4	91615	N	84.1	91540	N	0.0	0	N	93.7	91441
26	0	X	N	113.8	91922	N	78.6	91758	N	0.0	0	N	0.0	0
26	0	X	N	86.4	92014	N	0.0	0	N	0.0	0	N	0.0	0
26	92435	2TNA	Pr	113.4	92501	Y	71.8	92150	Y	0.0	0	Y	0.0	0
26	92449	2TNA	Pr	113.4	92501	Y	76.5	92201	Y	0.0	0	Y	0.0	0
26	0	X	N	86.5	92555	N	0.0	0	N	0.0	0	N	80.8	93408
26	93000	6TNA	Y	120.4	92941	Y	0.0	0	Y	0.0	0	Y	79.8	92930
26	0	X	N	112.9	93347	N	90.4	93633	N	87.6	93723	N	89.1	94239
26	94511	2TSH	Pr	109.2	94522	Pr	103.4	94602	Pr	95.5	94655	Y	98.6	94739
26	94550	5TSH	Pr	109.2	94522	Pr	103.4	94602	Pr	95.5	94655	Y	98.6	94739
26	0	X	N	94.0	94553	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	81.8	94715	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	79.4	94747	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	88.6	94848	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	75.9	94956	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	92.7	95040	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	113.7	100104	N	0.0	0	N	0.0	0	N	0.0	0
26	100341	1TSH	Y	84.3	100136	Y	91.3	95252	Y	85.2	95334	Y	89.3	95436
26	0	X	N	92.3	101138	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	77.9	101302	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	118.0	102228	N	0.0	0	N	0.0	0	N	81.6	101932
26	102500	2LSE	Y	110.4	102442	Y	0.0	0	Y	0.0	0	Y	72.6	102532
26	104400	4TSH	Y	98.7	104446	Y	97.8	104613	Y	94.7	104653	Y	102.8	104759
26	0	X	N	77.1	105542	N	0.0	0	N	0.0	0	N	94.7	102829
26	0	X	N	78.6	105610	N	0.0	0	N	0.0	0	N	78.6	105235
26	105751	4LSE	Y	78.6	105651	Y	0.0	0	Y	0.0	0	Y	0.0	105933
26	110125	1TSA	Y	87.7	105825	Y	0.0	0	Y	0.0	0	Y	82.3	110328
26	110125	X	N	81.4	110009	N	0.0	0	N	0.0	0	N	0.0	0
26	110125	X	N	78.1	110144	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	76.4	110240	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	87.5	110407	N	89.1	110554	N	83.8	110654	N	81.9	110746
26	0	X	N	94.9	112740	N	97.8	111310	N	89.5	111344	N	88.2	110914
26	0	X	N	81.2	112815	N	0.0	0	N	77.2	112526	N	83.6	111230
26	0	X	N	102.6	112920	N	0.0	0	N	0.0	0	N	96.3	111307
26	0	X	N	79.9	114612	N	0.0	0	N	0.0	0	N	89.8	111626
26	0	X	N	93.2	114755	N	0.0	0	N	0.0	0	N	94.9	111844

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
26	0	X	N	76.9	114904	N	0.0	0	N	0.0	0	N	87.4	112058
26	0	X	N	90.8	115137	N	0.0	0	N	0.0	0	N	86.4	112340
26	0	X	N	81.8	115331	N	0.0	0	N	0.0	0	N	100.0	112525
26	0	X	N	89.0	115404	N	0.0	0	N	0.0	0	N	83.0	115909
26	0	X	N	80.4	115538	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	80.3	115607	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	101.2	115659	N	76.2	115701	N	0.0	0	N	0.0	0
26	0	X	N	80.2	115805	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	81.1	115852	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	77.4	115953	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	81.7	120053	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	85.8	120122	N	86.8	120257	N	0.0	0	N	0.0	0
26	0	X	N	87.3	120409	N	0.0	0	N	0.0	0	N	0.0	0
26	120631	5FSD	Pr	106.1	120447	Y	0.0	0	Y	73.5	120346	Y	0.0	0
26	120631	2FSD	Pr	106.1	120447	Y	0.0	0	Y	79.0	120400	Y	0.0	0
26	0	X	N	82.2	120532	N	0.0	0	N	0.0	0	N	0.0	0
26	120825	2FSD	Th	114.9	120708	Y	90.5	120831	Y	82.3	120910	Y	0.0	0
26	120900	5LSD	Th	114.9	120708	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	120901	2FSB	Th	114.9	120708	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	121121	1TSA	Y	89.8	121008	Y	87.2	121157	Y	0.0	0	Y	80.2	121359
26	0	X	N	79.6	121045	N	0.0	0	N	0.0	0	N	0.0	0
26	121323	2FSD	Y	105.7	121134	Y	86.6	121316	Y	77.6	121243	Y	0.0	0
26	121609	2FSD	Pr	108.2	121443	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	121609	2FSB	Pr	108.2	121443	Y	89.1	121634	Y	81.7	121718	Y	0.0	0
26	121748	2LSD	Y	100.0	121617	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	121930	3LSE	Pr	101.8	121800	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	121930	3LSE	Pr	101.8	121800	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	121930	3LSE	N	93.6	121833	Y	0.0	0	N	0.0	0	Y	0.0	0
26	122000	2FSD	Pr	111.9	122000	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	122113	2FSD	Pr	111.9	122000	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	122251	1TSB	Y	93.2	122211	Y	90.4	122345	Y	85.5	122427	Y	0.0	0
26	122425	2LSD	Y	98.2	122306	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	122458	2LSD	Y	101.9	122337	Y	74.4	122538	Y	0.0	0	Y	0.0	0
26	122624	1FSB	Y	117.4	122504	Y	77.8	122729	Y	0.0	0	Y	0.0	0
26	123715	1FSC	Y	115.1	123608	Y	0.0	0	Y	87.0	122819	Y	0.0	0
26	124205	1FSC	Y	119.9	124035	Y	75.4	124255	Y	0.0	0	Y	0.0	0
26	124427	2FSH	Y	114.1	124234	Y	97.4	124451	Y	94.2	124529	Y	0.0	0
26	124814	1GSC	Y	115.7	124631	Y	82.6	124903	Y	92.5	124951	Y	0.0	0
26	125307	X	N	83.0	124654	N	0.0	0	N	0.0	0	N	0.0	0
26	125307	X	N	85.9	124811	N	0.0	0	N	0.0	0	N	0.0	0
26	125307	X	N	81.9	124837	N	0.0	0	N	0.0	0	N	0.0	0
26	125307	X	N	78.8	125059	N	0.0	0	N	0.0	0	N	0.0	0
26	125307	X	N	81.5	125144	N	0.0	0	N	0.0	0	N	0.0	0
26	125307	1TSH	Y	107.7	125244	Y	89.7	125316	Y	84.2	125356	Y	86.3	125448
26	0	X	N	80.7	125455	N	0.0	0	N	0.0	0	N	0.0	0
26	125427	1FSC	Y	102.4	125750	Y	0.0	0	Y	71.8	125424	Y	0.0	0
26	125940	1FSC	Y	113.3	130029	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	130216	1FSH	Y	86.4	130120	Y	82.3	130247	Y	0.0	0	Y	89.2	130453
26	130454	1FSB	Y	112.6	130314	Y	83.0	130528	Y	73.1	130627	Y	0.0	0
26	0	X	N	77.6	130528	N	0.0	0	N	0.0	0	N	0.0	0
26	131609	1GSB	Y	113.5	131418	Y	86.8	131704	Y	87.9	131749	Y	84.6	131718
26	132037	3TSA	Y	81.4	131506	Y	83.7	132104	Y	76.9	132149	Y	81.2	132242

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
26	132037	X	N	80.6	131848	N	0.0	0	N	0.0	0	N	87.1	134529
26	132037	X	N	76.6	131916	N	0.0	0	N	0.0	0	N	87.6	134645
26	132634	1GSB	Y	115.1	132454	Y	86.2	132734	Y	81.7	132829	Y	0.0	0
26	0	X	N	83.6	132553	N	0.0	0	N	0.0	0	N	99.6	134825
26	133811	1LSB	Y	114.3	133638	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	135056	1TSB	Y	95.3	134623	Y	85.5	135134	Y	0.0	0	Y	95.7	135101
26	135056	X	N	80.0	134726	N	0.0	0	N	0.0	0	N	95.3	135311
26	135056	X	N	86.8	134916	N	0.0	0	N	0.0	0	N	86.1	135736
26	135816	2TSB	Y	96.4	135655	Y	88.9	135841	Y	79.8	135929	Y	90.9	140015
26	140127	1GSB	Y	113.3	135954	Y	83.2	140224	Y	82.4	140453	Y	88.0	140143
26	0	X	N	85.1	140042	N	79.9	140959	N	96.2	141017	N	87.8	140514
26	141137	1GSB	Y	114.7	141009	Y	80.5	141356	Y	88.8	141458	Y	0.0	0
26	0	X	N	83.0	141058	N	0.0	0	N	0.0	0	N	91.9	140856
26	141313	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	85.6	140947
26	141624	1R	N	0.0	0	N	0.0	0	N	83.5	141537	N	0.0	0
26	141806	ULNE	Y	89.5	141715	Y	77.3	141651	Y	84.3	141654	Y	0.0	0
26	142144	1FNF	Y	0.0	0	Y	82.2	142019	Y	0.0	0	Y	0.0	0
26	142429	1GNA	Y	110.0	142404	Y	0.0	0	Y	85.4	142342	Y	93.9	141946
26	142614	2GNB	Y	117.6	142532	Y	83.2	142511	Y	80.2	142553	Y	99.9	143219
26	0	X	N	0.0	0	N	81.5	142935	N	90.3	142941	N	0.0	0
26	143337	2FND	Y	109.9	143301	Y	90.0	143249	Y	84.4	143328	Y	0.0	0
26	143623	2FNA	Y	112.0	143547	Y	80.7	143539	Y	84.5	143507	Y	71.8	143429
26	143747	1R	N	0.0	0	Y	71.6	143747	N	0.0	0	N	0.0	0
26	0	X	N	75.6	143835	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	83.1	144059	N	0.0	0	N	0.0	0	N	0.0	0
26	144149	4TNA	Y	97.4	144125	Y	0.0	0	Y	0.0	0	Y	0.0	144044
26	144301	1R	N	0.0	0	N	0.0	0	N	78.5	144339	N	0.0	0
26	145454	9LNE	Y	102.5	145332	Y	85.7	145136	Y	83.7	145217	Y	93.5	145235
26	145454	X	N	78.9	145501	N	0.0	0	N	0.0	0	N	0.0	0
26	145454	X	N	81.9	145740	N	0.0	0	N	0.0	0	N	0.0	0
26	145943	1FNB	Y	103.7	145841	Y	82.8	145739	Y	0.0	0	Y	92.2	145654
26	150229	2TNA	Fr	122.0	150158	Y	0.0	0	Y	0.0	0	Pr	85.2	150226
26	150229	2TNA	Fr	122.0	150158	Y	0.0	0	Y	0.0	0	Pr	85.2	150226
26	150300	5TNA	Fr	122.0	150158	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	150310	5TNA	Fr	122.0	150158	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	151359	1MNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.2	151000
26	151700	1GNB	Y	109.9	151600	Y	82.7	151210	Y	0.0	0	Y	84.3	151258
26	152507	1MNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	94.3	152254
26	0	X	N	80.4	152627	N	0.0	0	N	0.0	0	N	0.0	0
26	152751	1FNB	Y	101.0	152701	Y	0.0	0	Y	0.0	0	Y	92.9	152736
26	153024	1GNB	Y	112.0	152938	Y	84.3	152829	Y	0.0	0	Y	89.0	153437
26	153340	1GNB	Y	112.2	153244	Y	85.6	153147	Y	0.0	0	Y	93.8	153838
26	154000	2FSD	Y	79.2	153912	Y	80.7	153858	Y	73.2	153930	Y	0.0	153942
26	154137	2LSD	Y	101.2	154012	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	154551	1FNB	Y	103.6	154518	Y	81.6	154431	Y	0.0	0	Y	97.1	154338
26	155005	1GNB	Y	110.8	154930	Y	83.9	154816	Y	0.0	0	Y	94.7	155108
26	0	X	N	83.8	155107	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	86.5	155236	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	91.6	155350	N	92.1	155552	N	86.6	155644	N	0.0	0
26	160118	3FNB	Y	88.8	160058	Y	0.0	0	Y	0.0	0	Y	87.5	155743
26	160416	1MNC	Y	98.4	160330	Y	0.0	0	Y	0.0	0	Y	93.1	160205
26	160618	1LNB	Y	84.9	160542	Y	82.4	160501	Y	0.0	0	Y	87.8	160417

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	ACRT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
26	160702	2FND	Pr	91.9	160624	N	0.0	0	Y	0.0	0	Pr	92.6	160636
26	160702	2FND	Pr	91.9	160624	N	0.0	0	Y	0.0	0	Pr	92.6	160636
26	160906	2LND	Y	0.0	0	N	0.0	0	Y	81.7	160701	Y	0.0	0
26	160928	2FND	Y	107.0	160840	N	0.0	0	Y	0.0	0	Y	0.0	0
26	161103	1LNC	Y	99.3	161031	N	0.0	0	Y	74.5	161111	Y	0.0	0
26	161205	2FND	Y	83.8	161238	N	0.0	0	Y	0.0	0	Y	0.0	0
26	161252	3LNB	Y	0.0	0	N	0.0	0	Y	87.3	161223	Y	75.2	161156
26	161421	2FND	Y	111.7	161404	N	0.0	0	Y	0.0	0	Y	0.0	0
26	161610	5LNE	Y	0.0	0	N	0.0	0	Y	87.5	161638	Y	86.2	161454
26	161757	4LNE	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	87.5	161617
26	161817	2FND	Y	90.6	161741	N	0.0	0	Y	76.4	161827	Y	0.0	0
26	16.941	2FND	Y	109.8	161935	N	0.0	0	Y	0.0	0	Y	0.0	0
26	162123	4LNE	Y	87.9	162114	N	0.0	0	Y	0.0	0	Y	92.6	161801
26	162327	2FND	Y	87.8	162323	N	0.0	0	Y	76.9	162402	Y	86.8	162341
26	0	X	N	76.4	162530	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	82.7	162600	N	0.0	0	N	0.0	0	N	0.0	0
26	162716	2LND	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
26	163817	2LNE	Y	76.7	163726	Y	83.3	163623	Y	75.2	163651	Y	85.9	163555
26	163914	4MNG	Y	0.0	0	Y	78.0	163707	Y	0.0	0	Y	83.1	163630
26	164243	4LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	164352	5MND	Pr	103.2	164228	Pr	78.5	164343	Y	0.0	0	Pr	87.6	164139
26	164352	5MND	Pr	103.2	164228	Pr	78.5	164343	Y	0.0	0	Pr	87.6	164139
26	164521	2MNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	86.4	164319
26	164605	5FND	Pr	102.2	164401	Y	92.8	164446	Y	86.0	164510	Y	0.0	0
26	164605	5FND	Pr	102.2	164401	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	164659	2FND	Y	111.7	164537	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	164726	5LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	164746	5FND	Y	94.2	164627	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	164856	2GND	Y	113.5	164750	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	164926	5LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	165050	2FND	Y	107.4	165004	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	165231	2FSG	Y	88.4	165110	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	165324	2LSE	Y	99.0	165210	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	165408	3MNG	Y	0.0	0	Y	88.5	165324	Y	83.7	165357	Y	89.3	165236
26	165800	3LNF	Y	0.0	0	Y	0.0	0	Y	75.8	165712	Y	0.0	0
26	170707	4LNE	Y	97.2	170703	Y	71.6	170612	Y	0.0	0	Y	73.7	170540
26	171607	2GNA	Y	117.6	171554	Y	87.6	171505	Y	85.2	171531	Y	102.9	171424
26	173316	4LNE	Y	87.4	173245	Y	0.0	0	Y	70.3	173717	Pr	89.2	173125
26	0	X	N	76.4	174802	N	0.0	0	N	0.0	0	N	0.0	0
26	174952	8LNE	Y	93.4	174851	Y	77.4	174733	Y	0.0	0	Y	81.0	174659
26	175157	1TNB	Y	108.0	175035	N	0.0	0	Y	0.0	0	Y	0.0	0
26	175331	3LNE	N	78.9	180224	N	0.0	0	Y	0.0	0	Y	85.5	175013
26	180420	1FNB	Y	104.2	180300	Y	84.0	180203	Y	0.0	0	Y	90.4	180129
26	181615	1GNB	Y	109.5	181457	Y	81.2	181353	Y	0.0	0	Y	93.8	181313
26	182331	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
26	182834	1MNF	Y	0.0	0	Y	82.3	182632	Y	0.0	0	Y	91.4	182558
26	183123	1GNC	Y	111.3	183019	Y	100.7	183436	Y	76.7	183503	Y	0.0	0
26	183641	1GNB	Y	108.6	183528	N	0.0	0	Y	74.0	183511	Y	0.0	0
26	184603	1TNA	Y	107.9	184455	N	0.0	0	Y	0.0	0	Y	0.0	0
26	184926	1GNB	Y	108.9	184828	Y	84.1	184731	Y	0.0	0	Y	94.6	184642
26	185220	6LNE	Y	0.0	0	Y	86.9	185024	Y	81.7	185051	Y	100.7	184948
26	185350	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
26	185830	8TSB	Y	98.9	185624	Y	83.8	185939	Y	0.0	0	Y	0.0	0
26	190357	1FNB	Y	105.1	190315	Y	81.0	190231	Y	82.6	190032	Y	92.3	190145
26	190549	1TSH	Y	93.1	190430	Y	88.2	190641	Y	84.3	190725	Y	0.0	0
26	191123	1FNB	Y	101.8	191032	Y	82.5	190931	Y	0.0	0	Y	92.1	190855
26	0	X	N	84.5	191213	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	82.3	191341	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	77.7	191403	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	93.4	191626	N	0.0	0	N	0.0	0	N	0.0	0
26	191720	1MNF	Y	0.0	0	Y	71.8	191555	Y	0.0	0	Y	92.5	191522
26	192023	1GNC	Y	109.3	191949	Y	78.0	191805	Y	0.0	0	Y	0.0	0
26	0	X	N	77.7	192052	N	0.0	0	N	0.0	0	N	80.6	192016
26	0	X	N	84.0	192116	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	81.8	192156	N	0.0	0	N	0.0	0	N	0.0	0
26	0	X	N	81.9	192224	N	0.0	0	N	0.0	0	N	0.0	0
26	192407	1FNC	Y	101.3	192335	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	192526	1MNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	84.8	192336
26	192811	1GNB	Y	113.4	192752	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	192929	1GNC	Y	108.6	192854	Y	87.1	192752	Y	97.3	192812	Y	0.0	0
26	193207	6TNA	Y	119.9	193156	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	193512	1GNC	Y	108.4	193454	Y	82.2	193346	Y	96.8	193402	Y	0.0	0
26	194229	2TNA	Y	115.3	194155	Y	84.8	194224	Y	0.0	0	Y	0.0	0
26	194326	1LNC	Y	0.0	0	Y	0.0	0	Y	75.7	193820	Y	0.0	0
26	194415	1FNC	Y	98.6	194354	Y	0.0	0	Y	0.0	0	Y	0.0	0
26	194825	1GNB	Y	110.7	194845	Y	0.0	0	Y	0.0	0	Y	92.3	194236
26	195057	2TNA	Y	115.4	195054	Y	0.0	0	Y	0.0	0	Y	76.2	195134
26	200136	1GNB	Y	110.9	200103	Y	84.1	195958	Y	0.0	0	Y	96.6	195921
27	80445	1FNB	Y	109.4	80416	Y	88.1	80319	Y	0.0	0	Y	0.0	0
27	0	X	N	80.4	80935	N	0.0	0	N	0.0	0	N	0.0	0
27	81022	1GNB	Y	112.4	81050	Y	84.3	80941	Y	0.0	0	Y	89.5	80903
27	0	X	N	78.4	81143	N	0.0	0	N	0.0	0	N	0.0	0
27	0	X	N	80.0	81203	N	0.0	0	N	0.0	0	N	0.0	0
27	0	X	N	78.7	81227	N	0.0	0	N	0.0	0	N	0.0	0
27	81825	1FNA	Y	110.2	81730	Y	72.0	81625	Y	0.0	0	Y	92.0	81538
27	0	X	N	80.1	82001	N	0.0	0	N	0.0	0	N	0.0	0
27	82202	4TNA	Y	100.9	82104	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	82608	1FNB	Y	98.9	82507	Y	85.1	82417	Y	72.2	82456	Y	96.3	82342
27	0	X	N	82.9	82619	N	0.0	0	N	0.0	0	N	78.0	82701
27	0	X	N	83.9	82654	N	0.0	0	N	0.0	0	N	79.2	82741
27	0	X	N	82.7	82753	N	86.5	84016	N	82.9	83847	N	73.1	82843
27	83137	3TNA	Y	105.8	83036	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	83551	1GNB	Y	114.1	83518	Y	85.0	83413	Y	0.0	0	Y	94.4	83422
27	84345	1FNB	Y	98.3	84256	Y	85.1	84204	Y	0.0	0	Y	93.9	84121
27	84826	1GNB	Y	112.1	84756	Y	84.8	84648	Y	0.0	0	Y	96.3	84603
27	85116	5TNA	Pr	117.2	85028	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	85128	5TNA	Pr	117.2	85028	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	85612	1LNB	Y	88.9	85522	Y	84.8	85437	Y	0.0	0	Y	93.8	85345
27	90106	1FNB	Y	102.5	90019	Y	82.9	85923	Y	0.0	0	Y	93.2	85843
27	91228	1MNF	Y	0.0	0	Y	78.4	91049	Y	0.0	0	Y	94.6	91012
27	91528	1GNC	Y	110.7	91446	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	91719	9TNA	Y	108.3	91638	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	91954	1GNC	Y	110.8	91933	Y	90.3	91836	Y	78.6	91902	Y	0.0	0
27	92503	1GNB	Y	109.8	92437	Y	85.4	92329	Y	0.0	0	Y	73.9	93044

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
27	93838	1LNB	Y	98.6	93743	Y	0.0	0	Y	0.0	0	Y	93.8	93634
27	93838	X	N	82.2	93854	N	0.0	0	N	0.0	0	N	0.0	0
27	94059	2TNH	Y	119.6	94000	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	0	X	N	77.7	94327	N	0.0	0	N	0.0	0	N	88.2	94623
27	0	X	N	76.1	94350	N	0.0	0	N	0.0	0	N	74.9	94709
27	95125	UTNA	Y	113.4	95037	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	95442	1TNB	Y	106.1	95353	Y	0.0	0	Y	0.0	0	Y	78.2	95334
27	100743	1GNB	Y	108.8	100653	Y	87.1	100536	Y	0.0	0	Y	96.1	100458
27	101715	5FND	Pr	115.9	101553	Y	0.0	0	Pr	73.3	101013	Pr	93.5	101405
27	101715	5FND	Pr	115.9	101553	Y	0.0	0	Pr	73.3	101013	Pr	93.5	101405
27	101832	5LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	101854	5LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	102.02	1GNB	Y	110.8	102032	Y	84.0	101918	Y	0.0	0	Y	97.0	101835
27	102528	3MND	Y	98.1	102408	Y	0.0	0	Y	0.0	0	Y	89.4	102450
27	102725	3LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	74.3	102725
27	103457	1GNA	Y	109.6	103411	Y	83.4	103258	Y	0.0	0	Y	96.1	103216
27	0	X	N	78.3	103736	N	79.6	103952	N	0.0	0	N	83.0	104153
27	104751	1MNF	Y	82.9	104635	Y	0.0	0	Y	0.0	0	Y	86.5	104511
27	0	X	N	79.3	104810	N	0.0	0	N	0.0	0	N	0.0	0
27	105105	1GNB	Y	107.0	105002	Y	0.0	0	Y	0.0	0	Y	90.4	110133
27	0	X	N	77.0	105326	N	0.0	0	N	0.0	0	N	0.0	0
27	105957	4TNA	Y	97.6	105907	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	111916	1GNB	Y	108.1	111839	Y	84.5	111731	Y	0.0	0	Y	94.8	111641
27	0	X	N	86.5	113004	N	0.0	0	N	0.0	0	N	0.0	0
27	113204	1MNC	Y	109.6	113120	Y	83.5	113014	Y	0.0	0	Y	94.0	112919
27	0	X	N	82.8	113336	N	0.0	0	N	0.0	0	N	88.0	114242
27	113802	1FNC	Y	97.6	113705	Y	0.0	0	Y	78.0	113650	Y	0.0	0
27	114216	1TNA	Y	112.1	114125	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	114350	1LNC	Y	100.1	114245	Y	0.0	0	Y	84.4	113918	Y	0.0	0
27	0	X	N	80.2	114437	N	0.0	0	N	0.0	0	N	94.7	115350
27	114618	4TNA	Y	98.7	114537	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	115228	3TNA	Y	105.4	115150	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	115940	1TNA	Y	108.3	115902	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	120643	1TNA	Y	108.2	120608	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	121149	2TNA	Y	116.4	121118	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	0	X	N	0.0	0	N	0.0	0	N	80.5	121731	N	95.7	1202.7
27	121756	4LNE	Y	91.4	121758	Y	75.5	121634	Y	76.8	121757	Y	91.7	121558
27	0	X	N	0.0	0	N	76.2	122839	N	81.2	121820	N	93.6	121945
27	122527	1GNB	Y	111.9	122502	Y	84.1	122352	Y	0.0	0	Y	92.0	122302
27	123827	1GNA	Y	112.5	123819	Y	84.9	123717	Y	0.0	0	Y	96.5	123627
27	124325	2TNA	Y	114.0	124249	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	124554	5TNA	Pr	117.2	124537	Pr	76.4	124437	Y	0.0	0	Y	0.0	0
27	124554	5TNA	Pr	117.2	124537	Pr	76.4	124437	Y	0.0	0	Y	0.0	0
27	125410	1FNF	Y	77.0	125237	Y	72.2	125207	Y	0.0	0	Y	0.0	0
27	125716	1GNB	Y	110.7	125556	Y	0.0	0	Y	0.0	0	Y	87.2	125117
27	131134	1FNB	Y	104.1	131028	Y	83.6	130938	Y	0.0	0	Y	97.5	130848
27	132405	1MNC	Y	110.5	132249	Y	81.1	132129	Y	0.0	0	Y	96.5	132050
27	132921	1GNC	Y	110.2	132816	Y	99.0	132711	Y	82.8	132745	Y	9.1	132547
27	133459	1GNB	Y	108.8	133404	Y	99.4	133253	Y	80.2	133325	Y	94.2	131754
27	134845	1GNB	Y	109.4	134759	Y	83.6	134640	Y	0.0	0	Y	96.0	134558
27	135304	2TNA	Y	110.2	135200	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	140309	ULNE	Y	0.0	0	Y	85.4	140034	Y	76.7	140003	Y	84.8	135745

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
27	140505	1GNB	Pr	109.7	140420	Y	84.7	140304	Y	0.0	140416	Y	94.0	140208
27	140523	5MND	Th	109.7	140420	Y	85.7	140412	Y	87.1	140444	Y	83.9	140432
27	140614	5LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	141940	1FNB	Y	0.0	141935	Y	86.3	141807	Y	0.0	0	Y	94.1	141656
27	142031	2MND	Pr	109.7	141935	Y	93.0	141831	Y	84.7	141910	Y	83.0	141826
27	142159	2FND	Pr	109.7	141935	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	142309	2FND	Pr	101.8	142219	Y	71.4	142230	Y	0.0	0	Y	0.0	0
27	142354	5MND	Pr	101.8	142219	Y	83.8	142244	Y	73.3	142324	Y	79.0	142117
27	142431	5LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	142500	2FND	Y	104.9	142412	Y	0.0	0	Y	82.0	142651	Y	0.0	0
27	142641	7LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	89.2	142447
27	142729	2FND	Y	0.0	0	Y	96.0	142655	Y	91.6	142726	Y	0.0	0
27	142830	2LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	143136	1FNF	Y	0.0	0	Y	71.6	142912	Y	0.0	0	Y	0.0	0
27	143514	1GNA	Y	107.9	143352	Y	0.0	0	Y	0.0	0	Y	92.9	142836
27	0	X	N	78.9	143723	N	0.0	0	N	0.0	0	N	84.3	144247
27	144011	4TNB	Y	101.2	143903	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	144833	1GNB	Y	110.4	144730	Y	81.6	144610	Y	0.0	0	Y	92.1	144524
27	145423	4FNB	Y	90.5	145317	Y	72.8	145225	Y	0.0	0	Y	86.2	145139
27	145642	5TNA	Y	108.4	145532	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	150138	1MNC	Y	98.5	150040	Y	87.2	145938	Y	84.8	150003	Y	93.1	145840
27	150516	4FNB	Y	91.1	150429	Y	0.0	0	Y	0.0	0	Y	86.3	150250
27	150747	1GNC	Y	109.4	150640	Y	80.7	150533	Y	80.1	150526	Y	0.0	0
27	151237	1GNC	Y	109.8	151153	Y	88.0	151025	Y	93.8	151053	Y	0.0	0
27	151507	UTNH	Y	99.5	151431	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	151738	1GNC	Y	109.4	151644	Y	97.5	151529	Y	75.2	151553	Y	0.0	0
27	151809	1MNF	Y	0.0	0	Y	73.7	151628	Y	0.0	0	Y	90.4	151403
27	152105	1GNB	Y	106.2	152039	Y	0.0	0	Y	76.8	151605	Y	92.2	151504
27	152129	4MNC	Y	0.0	152039	Y	0.0	0	Y	0.0	0	Y	83.1	151927
27	152332	4LNC	Y	0.0	0	Y	72.0	152236	Y	0.0	0	Y	0.0	0
27	152417	4MNC	Y	86.1	152319	Y	0.0	0	Y	0.0	0	Y	86.6	152146
27	152538	1GNC	Y	109.4	152519	Y	91.2	152407	Y	72.8	152428	Y	0.0	0
27	152745	5TNA	Pr	117.3	152722	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	152800	5TNA	Pr	117.3	152722	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	153009	1FNB	Y	103.9	152954	Y	99.2	152856	Y	79.9	152920	Y	72.7	152559
27	153357	4FNB	Y	92.2	153337	Y	0.0	0	Y	0.0	0	Y	88.1	153200
27	153713	1FNB	Y	106.7	153702	Y	84.8	153557	Y	0.0	0	Y	97.0	153513
27	153949	7TNH	Y	107.4	153948	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	154551	1GNB	Y	106.4	154447	Y	85.5	154323	Y	0.0	0	Y	95.9	154232
27	154800	4FNB	Y	89.6	154649	Y	79.1	154600	Y	0.0	0	Y	81.2	154514
27	155145	1FNB	Y	101.4	155042	Y	85.7	155004	Y	0.0	0	Y	94.1	154907
27	155518	3MND	Y	85.6	155411	Y	76.0	155347	Y	0.0	0	Y	85.1	152555
27	155721	3FND	Y	0.0	155629	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	155743	2MND	Y	108.2	155629	Y	86.6	155613	Y	81.8	155639	Y	94.8	155549
27	155839	3LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
27	160008	2FND	Y	0.0	0	Y	90.0	155857	Y	90.4	155934	Y	0.0	0
27	160124	4FNB	Y	90.3	160107	N	0.0	0	Y	82.3	160105	Y	90.0	155924
27	160158	2FND	Y	0.0	0	N	0.0	0	Y	87.1	160151	Y	0.0	0
27	160320	2FND	Y	105.6	160257	N	0.0	0	Y	0.0	0	Y	0.0	0
27	160503	2LND	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
27	160718	1FNB	Y	97.9	160733	N	0.0	0	Y	0.0	0	Y	96.3	160601
27	161436	4FNB	Y	91.0	161459	N	0.0	0	Y	0.0	0	Y	87.8	161320

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
27	151629	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
27	162059	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
27	162530	1FNF	Y	81.5	162537	N	0.0	0	Y	0.0	0	Y	0.0	0
27	162850	1FNB	Y	104.0	162913	N	0.0	0	Y	0.0	0	Y	93.3	162421
27	163055	4LNB	Y	79.6	163229	N	0.0	0	Y	0.0	0	Y	85.8	162935
27	163055	X	N	78.6	163345	N	0.0	0	N	0.0	0	N	0.0	0
27	163055	X	N	77.4	163458	N	0.0	0	N	0.0	0	N	0.0	0
27	164044	1FNA	Y	97.0	164114	N	0.0	0	Y	0.0	0	Y	96.6	163953
27	164252	5MND	Pr	96.8	164309	N	0.0	0	Pr	73.4	164055	Pr	86.6	164222
27	164252	5MND	Pr	96.8	164309	N	0.0	0	Pr	73.4	164055	Pr	86.6	164222
27	164418	5FND	Y	98.6	164444	N	0.0	0	Y	0.0	0	Y	0.0	0
27	164557	5FND	Y	96.4	164631	N	0.0	0	Y	0.0	0	Y	0.0	0
27	164605	5LND	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
27	164724	5FNB	Y	98.1	164806	N	0.0	0	Y	0.0	0	Y	91.5	165646
27	164959	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
27	165326	1FNB	Y	97.8	165428	N	0.0	0	Y	78.5	165358	Y	92.0	165243
27	165708	5FND	Y	98.0	165756	N	0.0	0	Y	0.0	0	Y	0.0	0
27	165845	5LND	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
27	170723	1FNB	Y	98.9	170646	N	0.0	0	Y	0.0	0	Y	92.4	170455
27	171029	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
27	171852	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
27	172036	1FNB	Y	96.5	171943	N	0.0	0	Y	0.0	0	Y	95.8	171806
27	0	X	N	86.4	172047	N	0.0	0	N	0.0	0	N	0.0	0
27	0	X	N	85.4	172202	N	0.0	0	N	0.0	0	N	0.0	0
27	172316	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
27	173553	1LNB	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	91.6	173338
27	174944	2FNB	Y	103.4	174914	N	0.0	0	Y	86.8	174934	Y	98.1	174843
27	175826	2MND	Y	115.8	175755	N	0.0	0	Y	84.8	175816	Y	91.8	175726
27	180026	2LND	Y	0.0	0	N	0.0	0	Y	0.0	0	Y	0.0	0
27	180212	8LNE	Y	91.5	180250	N	0.0	0	Y	0.0	0	Y	85.9	180037
27	182456	2LNE	Y	78.8	182505	N	0.0	0	Y	84.8	182453	Y	94.5	182405
27	182456	X	N	76.6	182525	N	0.0	0	N	0.0	0	N	0.0	0
27	183710	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
27	185613	8TSB	Y	76.7	185414	N	79.1	185738	Y	0.0	0	Y	79.9	185935
28	80140	1FNF	Y	0.0	0	Y	82.1	75954	Y	0.0	0	Y	0.0	0
28	80410	1FNA	Y	104.2	80320	Y	0.0	0	Y	0.0	0	Y	95.6	75922
28	0	X	N	82.8	80626	N	0.0	0	N	0.0	0	N	0.0	0
28	80726	1FNB	Y	101.7	80659	Y	80.6	80830	Y	0.0	0	Y	93.3	80533
28	81151	1FNB	Y	103.5	81114	Y	83.9	81032	Y	0.0	0	Y	94.2	80932
28	81440	4LNE	Y	89.3	81355	Y	0.0	0	Y	0.0	0	Y	86.4	81233
28	81440	X	N	80.4	81505	N	0.0	0	N	0.0	0	N	0.0	0
28	81633	1GNB	Y	109.8	81629	Y	87.3	81532	Y	73.3	81601	Y	91.1	81447
28	82027	1GNB	Y	113.3	82037	Y	81.6	81939	Y	0.0	0	Y	94.6	81851
28	0	X	N	82.1	82226	N	0.0	0	N	0.0	0	N	0.0	0
28	0	X	N	86.3	82407	N	0.0	0	N	0.0	0	N	0.0	0
28	82555	1MNG	Y	0.0	82517	Y	85.8	82447	Y	0.0	0	Y	94.5	82404
28	0	X	N	85.4	82713	N	77.7	82606	N	0.0	0	N	0.0	0
28	0	X	N	80.5	82819	N	0.0	0	N	0.0	0	N	0.0	0
28	82900	1GNB	Y	112.0	82902	Y	73.1	82811	Y	76.1	82848	Y	76.4	82814
28	83020	1FNB	Y	101.0	83017	Y	73.9	82943	Y	0.0	0	Y	86.8	82915
28	83447	1FNG	Y	0.0	0	Y	86.3	83317	Y	74.5	83347	Y	0.0	0
28	83520	3TNA	Y	105.8	83503	Y	0.0	0	Y	0.0	0	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
28	83748	1GNB	Y	110.3	83711	Y	0.0	0	Y	0.0	0	Y	80.2	83238
28	83921	1LNB	Y	100.0	83822	Y	71.8	83759	Y	0.0	0	Y	0.0	0
28	84103	4TNB	Y	93.7	84038	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	0	X	N	78.4	84110	N	0.0	0	N	0.0	0	N	0.0	0
28	0	X	N	77.3	84133	N	0.0	0	N	0.0	0	N	0.0	0
28	84231	1FNB	Y	102.3	84210	Y	85.7	84115	Y	0.0	0	Y	92.1	84041
28	84504	9LNE	Y	102.5	84438	Y	84.2	84356	Y	75.4	84508	Y	92.2	84326
28	84504	X	N	97.7	84702	N	74.5	84603	N	80.6	84527	N	0.0	0
28	85050	1GNB	Y	109.7	85023	Y	83.6	84925	Y	82.1	84853	Y	92.9	84835
28	85317	4GNB	Y	98.5	85228	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	85530	1GNB	Y	111.9	85508	Y	86.3	85403	Y	75.1	85430	Y	89.6	85310
28	85701	1TNA	Y	109.3	85646	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	85925	4GNB	Y	98.7	85845	Y	79.4	85749	Y	87.2	85808	Y	0.0	0
28	90123	1FNB	Y	99.6	90034	Y	89.8	85939	Y	0.0	0	Y	82.3	90323
28	90516	3FNG	Y	88.0	90440	Y	78.4	90415	N	82.6	90444	Y	0.0	0
28	90602	4FNB	Y	93.4	90528	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	90710	1GNB	Y	110.1	90708	Y	98.1	90602	Y	86.4	90620	Y	0.0	0
28	90742	3FSH	Y	102.5	90759	Y	84.0	90832	Y	0.0	0	Y	0.0	0
28	90841	3FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	91002	1GNB	Y	111.3	90943	Y	0.0	0	Y	0.0	0	Y	96.5	90746
28	91047	3FND	Y	99.3	91023	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	91201	4LNC	Y	84.3	91137	Y	78.5	91048	Y	90.9	91108	Y	0.0	0
28	91346	3LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	92050	1GNB	Y	109.0	92100	Y	87.5	91958	Y	71.9	92021	Y	88.2	91857
28	92400	1FNB	Y	102.1	92406	Y	83.0	92312	Y	0.0	0	Y	92.8	92224
28	93443	1GNB	Y	107.6	93511	Y	88.0	93359	Y	76.5	93425	Y	95.6	93305
28	93821	4TNA	Y	99.1	93740	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	93924	1TNC	Y	103.8	93855	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	94128	1FNB	Y	101.0	94055	Y	84.3	94009	Y	0.0	0	Y	91.4	93908
28	94408	1GNB	Y	110.2	94335	Y	99.2	94238	Y	81.7	94310	Y	0.0	0
28	94633	1TNA	Y	111.9	94558	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	94806	1GNB	Y	107.4	94738	Y	86.9	94631	Y	0.0	0	Y	93.4	94534
28	95736	1GNB	Y	109.7	95725	Y	86.7	95614	Y	0.0	0	Y	95.3	95532
28	100133	1FNF	Y	0.0	0	Y	87.7	95959	Y	0.0	0	Y	0.0	0
28	100414	1GNB	Y	113.8	100353	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	100704	1LNB	Y	85.2	100612	Y	86.3	100546	Y	74.1	100936	Y	90.4	100435
28	100704	X	N	80.0	100754	N	0.0	0	N	75.3	100955	N	0.0	0
28	101022	1GNB	Y	112.3	101021	Y	90.4	100926	Y	79.7	101048	Y	89.8	100824
28	101526	1FNF	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	101838	1GNB	Y	111.5	101853	Y	95.5	101500	Y	77.4	101524	Y	0.0	0
28	102331	1GNB	Y	110.8	102336	Y	85.8	102243	Y	0.0	0	Y	95.9	102151
28	0	X	N	76.4	102457	N	0.0	0	N	0.0	0	N	0.0	0
28	102523	1TNA	Y	110.9	102536	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	102903	2TNA	Y	118.2	102908	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	103126	1GNC	Y	109.2	103142	Y	85.0	103028	Y	0.0	0	Y	0.0	0
28	103510	1GNB	Y	109.4	103526	Y	83.9	103413	Y	0.0	0	Y	98.7	102946
28	103800	1GNB	Y	110.7	103816	Y	81.8	103718	Y	79.6	103622	Y	96.6	103337
28	104339	5TNA	Pr	118.4	104359	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	104339	5TNA	Pr	118.4	104359	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	104658	2TNA	Y	116.1	104659	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	104741	1GNB	Y	110.1	104816	Y	86.5	104705	Y	0.0	0	Y	95.3	104622
28	105156	1MNC	Y	110.9	105214	Y	84.1	105055	Y	0.0	0	Y	92.6	105005

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
28	105717	3TNA	Y	105.2	105738	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	105818	1GNC	Y	105.4	105902	Y	80.9	105807	Y	0.0	0	Y	0.0	0
28	105912	1GNB	Y	108.5	105948	Y	85.2	105841	Y	0.0	0	Y	96.4	105801
28	110506	1GNC	Y	110.6	110435	Y	100.4	110322	Y	88.6	110345	Y	0.0	0
28	110801	3TNA	Y	105.7	110704	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	111220	2TNA	Y	120.4	111134	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	111500	9TSA	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	111834	1MNC	Y	108.4	111824	Y	85.8	111711	Y	0.0	0	Y	94.8	111624
28	112431	1LNC	Y	0.0	0	Y	92.4	112254	Y	80.4	111853	Y	0.0	0
28	113144	3LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	113743	1FNF	Y	0.0	0	Y	88.7	113616	Y	71.3	113701	Y	0.0	0
28	114045	1GNB	Y	109.1	114037	Y	75.5	114134	Y	0.0	0	Y	94.0	113537
28	114300	4LNE	Y	83.8	114228	Y	0.0	0	Y	0.0	0	Y	86.4	114048
28	114300	X	N	78.4	114559	N	0.0	0	N	0.0	0	N	0.0	0
28	115405	1GNB	Y	107.1	115348	Y	87.3	115252	Y	0.0	0	Y	95.3	115157
28	120300	1MNC	Y	91.2	120253	Y	86.3	120407	Y	72.7	120424	Y	90.4	120008
28	120700	1FNB	Y	106.8	120622	Y	0.0	0	Y	0.0	0	Y	95.2	120322
28	0	X	N	96.2	120710	N	0.0	0	N	0.0	0	N	0.0	0
28	121045	5FSD	Pr	120.5	120950	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	121215	5LSD	Y	99.5	121113	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	121609	3TSA	Y	89.0	121518	Y	89.5	121727	Y	84.2	121819	Y	85.9	121906
28	0	X	N	86.1	121705	N	0.0	0	N	0.0	0	N	0.0	0
28	0	X	N	87.3	121824	N	0.0	0	N	75.7	121840	N	0.0	0
28	0	X	N	83.1	121913	N	0.0	0	N	0.0	0	N	0.0	0
28	122213	1MNC	Y	98.1	122220	Y	85.9	122141	Y	81.7	122205	Y	95.0	122039
28	122415	1TNA	Y	110.4	122459	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	122554	1LNC	Y	0.0	0	Y	87.2	122544	Y	83.8	122632	Y	0.0	0
28	122613	5FSG	Y	79.6	122657	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	122647	5FSG	Y	78.8	122726	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	122704	5FSD	Y	79.3	122756	Y	88.8	122702	Y	82.6	122747	Y	0.0	0
28	122920	5FSD	Pr	94.8	122847	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	122926	2FSD	Pr	94.8	122847	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	123059	3FSB	Y	0.0	123245	Y	0.0	0	Y	0.0	0	Y	89.7	122808
28	123128	5FSG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	123208	2FSG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	123239	5LSE	Y	0.0	123245	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	123258	2FSD	Th	109.5	123245	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	123333	2FSD	Th	109.5	123245	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	123445	4TSH	Y	0.0	0	Y	84.8	123440	Y	81.5	123518	Y	87.8	123901
28	123659	2FSD	Pr	113.2	123628	Pr	78.5	123658	Y	0.0	0	Y	0.0	0
28	123659	2FSD	Pr	113.2	123628	Pr	78.5	123658	Y	0.0	0	Y	0.0	0
28	0	X	N	79.4	123715	N	0.0	0	N	0.0	0	N	0.0	0
28	123859	2GSD	Y	110.2	123842	Y	71.0	123810	Y	0.0	0	Y	0.0	0
28	123905	2GSD	Y	107.7	124019	Y	71.2	123818	Y	0.0	0	Y	0.0	0
28	124221	2GSD	Pr	111.6	124218	Pr	74.9	124158	Y	0.0	0	Y	0.0	0
28	124241	2GSD	Pr	111.6	124218	Pr	74.9	124158	Y	0.0	0	Y	0.0	0
28	124422	3GSD	Y	90.7	124318	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	124507	2FSD	Pr	112.5	124449	Pr	74.4	124445	Y	0.0	0	Y	0.0	0
28	124507	2FSD	Pr	112.5	124449	Pr	74.4	124445	Y	0.0	0	Y	78.8	124540
28	124640	3FSD	Y	0.0	124449	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	0	X	N	79.9	124701	N	0.0	0	N	0.0	0	N	0.0	0
28	124714	2FSG	Y	107.6	124730	Y	0.0	0	Y	0.0	0	Y	83.1	124734

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	ACRT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
28	124743	2LSD	Th	107.6	124730	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	124806	3FSB	Y	79.2	124827	Y	0.0	0	Y	0.0	0	Y	91.6	124904
28	124856	2LSD	Y	79.5	124910	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	125112	4TSH	Y	88.2	125219	Y	82.7	125219	Y	71.4	125318	Y	80.2	125429
28	125338	3TSH	Y	90.4	125433	Y	85.9	125435	Y	80.2	125518	Y	83.2	125615
28	125627	5TSD	Y	101.0	125542	Y	77.6	125931	Y	0.0	0	Y	0.0	0
28	0	5FSD	Pr	116.8	125931	Y	78.1	130045	Y	0.0	0	Y	0.0	0
28	130218	5LSD	Y	90.8	130100	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	0	X	N	83.0	130230	N	0.0	0	N	0.0	0	N	0.0	0
28	130424	3FSG	Y	88.5	130417	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	130527	3GSD	Y	88.2	130528	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	130633	2TSA	Y	83.8	130611	Y	97.7	130703	Y	91.7	130742	Y	0.0	0
28	0	X	N	0.0	130709	N	0.0	0	N	0.0	0	N	0.0	0
28	130802	3FSG	Y	91.2	130810	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	130920	3GSD	Y	87.5	130926	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	131018	2TSA	Y	0.0	0	Y	97.0	131056	Y	93.5	131136	Y	0.0	0
28	131141	3GSD	Y	89.5	131038	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	131343	3FSD	Y	91.6	131405	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	131411	3TSA	Y	0.0	131405	Y	89.2	131521	Y	83.7	131607	Y	86.9	131725
28	131526	3FSG	Y	91.5	131606	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	131653	3FSD	Y	80.9	131746	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	0	X	N	87.3	131833	N	0.0	0	N	0.0	0	N	0.0	0
28	131902	2TSA	Y	0.0	132048	Y	99.9	131957	Y	96.4	132043	Y	96.7	132126
28	131923	3GSD	Pr	110.9	132048	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	132423	3GSD	Y	107.5	132354	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	132613	3FSD	Y	97.8	132556	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	132803	3FSD	Y	91.8	132802	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	133011	3FSD	Y	82.1	133024	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	133210	3FSD	Y	90.2	133216	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	133251	3TSH	Y	0.0	0	Y	86.5	133324	Y	81.6	133420	Y	83.9	133457
28	133446	3GSD	Y	90.1	133434	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	0	X	N	82.8	133525	N	0.0	0	N	0.0	0	N	0.0	0
28	133834	3LSD	Y	99.8	133840	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	134035	4LSE	Y	83.6	134235	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	134719	1TSA	Y	77.2	134539	Y	92.4	134755	Y	87.6	134851	Y	89.1	134934
28	0	X	N	84.4	140419	N	0.0	0	N	0.0	0	N	86.0	140414
28	141147	1TSB	Y	79.6	141041	Y	84.5	141222	Y	0.0	0	Y	79.0	142526
28	142446	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
28	142523	4LSE	Y	100.2	142339	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	142821	1FSB	Y	111.9	142600	Y	85.5	142811	Y	0.0	0	Y	92.2	143032
28	143837	1FSB	Y	106.9	143711	Y	84.4	143938	Y	0.0	0	Y	82.9	143404
28	144404	1R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
28	144712	2GSD	Y	118.1	144551	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	0	X	N	83.6	144626	N	0.0	0	N	0.0	0	N	0.0	0
28	144902	2FSH	Y	113.3	144739	Y	98.7	144922	Y	94.4	145007	Y	85.2	145046
28	145120	1FSB	Y	96.3	145006	Y	99.7	145341	Y	95.1	145423	Y	91.4	145459
28	0	X	N	91.5	145156	N	0.0	0	N	80.6	145458	N	0.0	0
28	145645	5TSB	Pr	110.2	145431	Pr	103.5	145727	Pr	97.8	145824	Y	97.1	150033
28	145645	5TSB	Pr	110.2	145431	Pr	103.5	145727	Pr	97.8	145824	Y	92.1	150153
28	145645	x	N	91.5	145544	N	0.0	0	N	0.0	0	N	0.0	0
28	150350	1GSB	Y	113.2	150236	Y	88.1	150519	Y	82.2	150608	Y	81.0	150903
28	152246	1TSB	Y	87.2	150821	Y	97.4	152351	Y	91.1	152448	Y	87.8	152558

Ops Log Day	Ops Log Time	Ops Log AORT	Site 1 #	Site 1 SEL	Site 1 Time	Site 7 #	Site 7 SEL	Site 7 Time	Site 8 #	Site 8 SEL	Site 8 Time	Site 9 #	Site 9 SEL	Site 9 Time
28	152246	X	N	82.6	151631	N	0.0	0	N	0.0	0	N	0.0	0
28	152246	X	N	78.1	152124	N	0.0	0	N	0.0	0	N	0.0	0
28	152246	X	N	81.3	152157	N	0.0	0	N	73.4	152536	N	0.0	0
28	154752	1FNB	Y	102.6	154635	Y	82.4	154539	Y	74.9	154607	Y	96.2	154458
28	155210	1GNB	Y	104.3	155055	Y	80.2	154949	Y	0.0	0	Y	92.9	155109
28	0	X	N	79.8	155414	N	0.0	0	N	0.0	0	N	0.0	0
28	0	X	N	90.7	155455	N	0.0	0	N	0.0	0	N	0.0	0
28	0	X	N	87.2	155547	N	0.0	0	N	0.0	0	N	0.0	0
28	160027	1FSC	Y	115.9	155847	Y	90.8	155632	Y	84.2	155720	Y	0.0	0
28	160602	1GNA	Y	106.5	160416	Y	83.7	160406	Y	0.0	0	Y	94.6	160324
28	161005	5MSD	Pr	113.2	160920	Y	0.0	0	Y	0.0	0	Y	9.4	160554
28	161058	1GSC	Pr	113.2	160920	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	161205	5LSD	Y	101.9	161025	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	161314	5LSE	Y	99.2	161140	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	161707	1LSC	Y	107.1	161531	Y	0.0	0	Y	0.0	0	Y	77.6	161632
28	0	X	N	0.0	0	N	0.0	0	N	80.2	162107	N	91.1	161727
28	162818	5FSD	Y	107.1	162658	Y	74.3	162855	Y	0.0	0	Y	0.0	0
28	162818	2LSE	Th	107.1	162658	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	163041	5LSD	Y	99.2	162915	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	0	X	N	76.9	163237	N	0.0	0	N	0.0	0	N	0.0	0
28	163340	1TNC	Y	98.4	163310	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	163806	1LNC	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	164141	2FSD	Pr	113.2	164023	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	164141	1GSB	Pr	113.2	164023	Y	90.3	164256	Y	0.0	0	Y	90.6	164711
28	0	X	N	79.7	164116	N	0.0	0	N	0.0	0	N	0.0	0
28	164259	2FSD	Y	102.9	164150	Y	85.6	164329	Y	83.7	164343	Y	0.0	0
28	0	X	N	79.1	164242	N	0.0	0	N	0.0	0	N	0.0	0
28	164505	2FSD	Y	104.3	164529	Y	98.2	164543	Y	93.4	164629	Y	0.0	0
28	164630	2TSD	Y	0.0	164529	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	164715	2FSD	Y	115.4	164641	Y	78.9	164721	Y	83.7	164815	Y	0.0	0
28	164930	6LSE	Pr	106.7	164854	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	165010	2LSE	Pr	106.7	164854	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	165035	2FSD	Y	99.8	165007	Y	102.0	165056	N	99.9	165143	Y	0.0	0
28	0	X	N	76.6	165218	N	0.0	0	N	0.0	0	N	0.0	0
28	165318	3TSH	Y	0.0	0	Y	86.9	165436	Y	80.6	165531	Y	0.0	0
28	165448	2FSG	Y	113.8	165406	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	165544	1FSF	Y	81.2	165620	Y	88.0	165559	Y	0.0	0	Y	0.0	0
28	165616	2FSB	Y	106.2	165641	Y	104.0	165839	Y	97.9	165633	Y	85.1	165616
28	0	X	N	79.9	165915	N	0.0	0	N	0.0	24028	N	0.0	0
28	165916	1GNC	Y	108.0	165948	Y	0.0	0	Y	71.9	165945	Y	0.0	0
28	170424	1GNC	Y	114.0	170244	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	170618	2FSD	Y	111.4	170452	Y	97.3	170654	Y	94.9	170746	Y	0.0	0
28	170917	1GSB	Y	112.9	170739	Y	90.6	171010	Y	87.7	171109	Y	0.0	0
28	171500	2FSD	Y	106.2	171336	Y	84.8	171538	Y	76.1	171604	Y	0.0	0
28	171744	2LSD	Y	100.7	171625	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	171943	1FSF	Y	103.8	171839	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	172259	1GNC	Y	104.8	172240	Y	0.0	0	Y	74.5	172118	Y	0.0	0
28	172729	1LSF	Y	97.3	172619	Y	0.0	0	Y	0.0	0	Y	87.1	172642
28	0	X	N	79.6	173320	N	0.0	0	N	0.0	0	N	87.1	173121
28	174527	8LSE	Y	101.7	174418	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	174807	1TSB	Y	0.0	0	Y	78.8	174921	Y	75.6	175009	Y	0.0	0
28	175704	1GNB	Y	108.9	175705	Y	82.2	175554	Y	0.0	0	Y	92.4	175511

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
28	180035	1TSA	Y	0.0	0	Y	90.9	180146	Y	85.9	180240	Y	80.4	180324
28	180645	2TSD	Pr	91.6	180601	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	180645	2TSD	Pr	91.6	180601	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	180758	2FSD	Y	105.8	180731	Y	81.3	180845	Y	71.7	180934	Y	0.0	0
28	0	X	N	84.0	180755	N	0.0	0	N	0.0	0	N	0.0	0
28	180910	2LSD	Y	101.9	180915	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	180954	2LSD	Th	105.3	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	181045	1FSB	Y	105.3	181037	Y	81.3	181249	Y	78.4	181336	Y	0.0	0
28	181958	2R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
28	182146	1GSB	Y	115.2	182125	Y	82.2	182348	Y	0.0	0	Y	0.0	0
28	0	X	N	77.1	182212	N	0.0	0	N	0.0	0	N	0.0	0
28	182626	2TSA	Pr	93.9	182618	Pr	100.2	182759	Pr	95.3	182843	Pr	95.7	182909
28	182626	2TSA	Pr	93.9	182618	Pr	100.2	182759	Pr	95.3	182843	Pr	95.7	182909
28	183136	1GSB	Y	112.4	183121	Y	84.9	183343	Y	76.4	183457	Y	0.0	0
28	183509	1LSE	Y	112.6	183457	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	183509	X	N	76.9	183527	N	0.0	0	N	0.0	0	N	0.0	0
28	183945	8TSB	Y	0.0	0	Y	82.9	184204	Y	78.8	184302	Y	72.5	184403
28	184326	1GSB	Y	110.6	184320	Y	88.5	184601	Y	76.4	184651	Y	0.0	0
28	0	X	N	81.4	184403	N	0.0	0	N	0.0	0	N	0.0	0
28	185413	1GSC	Y	112.9	185403	Y	79.0	185632	Y	0.0	0	Y	0.0	0
28	185843	2TSH	Pr	93.1	185852	Pr	99.3	190042	Pr	93.8	190140	Pr	93.7	190222
28	185843	2TSH	Pr	93.1	185852	Pr	99.3	190042	Pr	93.8	190140	Pr	93.7	190252
28	0	1GSC	Y	113.7	185933	N	0.0	0	N	0.0	0	Y	0.0	0
28	0	X	N	76.1	190423	N	0.0	0	N	0.0	0	N	0.0	0
28	190459	1LSC	Y	113.0	190514	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	190645	1TSB	Y	0.0	0	Y	86.6	191121	Y	83.5	191210	Y	0.0	0
28	191319	4LSE	Y	102.1	191341	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	0	X	N	80.4	191421	N	0.0	0	N	0.0	0	N	0.0	0
28	191943	1GSB	Y	112.3	192013	Y	84.9	192257	Y	86.1	192348	Y	0.0	0
28	192908	1MNC	Y	106.8	193048	Y	85.1	192920	Y	0.0	0	Y	91.4	192843
28	193207	1TNB	Y	103.9	193339	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	193340	1GNC	Y	107.6	193533	Y	0.0	0	Y	0.0	0	Y	0.0	0
28	193850	1LNC	Y	0.0	0	Y	85.3	193931	Y	0.0	0	Y	0.0	0
28	194533	1GNB	Y	108.9	194729	Y	79.6	194608	Y	0.0	0	Y	91.3	194524
28	195906	1GNB	Y	108.8	195959	Y	84.0	195950	Y	0.0	0	Y	93.7	195857
28	0	X	N	105.1	201315	N	85.1	201213	N	0.0	0	N	91.5	193837
29	81026	1FNA	Y	99.4	80946	Y	83.0	80850	Y	73.0	80916	N	0.0	0
29	82515	1TNA	Y	111.6	82522	Y	0.0	0	Y	0.0	0	N	0.0	0
29	0	X	N	81.7	83754	N	0.0	0	N	0.0	0	N	0.0	0
29	84131	5TNA	Th	122.7	84137	Y	0.0	0	Y	0.0	0	N	0.0	0
29	84131	5TNA	Th	122.7	84137	Y	0.0	0	Y	0.0	0	N	0.0	0
29	84131	5TNA	Th	122.7	84137	Y	0.0	0	Y	0.0	0	N	0.0	0
29	84454	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	0	X	N	88.6	84647	N	0.0	0	N	0.0	0	N	0.0	0
29	84704	1TNA	Th	112.0	84723	Y	0.0	0	Y	0.0	0	N	0.0	0
29	84757	2TNA	Y	112.0	84723	Y	0.0	0	Y	0.0	0	N	0.0	0
29	84831	5FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	84911	5LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	85431	1LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	85707	5FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	85707	5FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	85749	3TNA	N	0.0	0	Y	0.0	0	N	0.0	0	N	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
29	85829	5LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	85857	3TNA	N	0.0	0	Y	0.0	0	N	0.0	0	N	0.0	0
29	85902	5LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	90128	1TNA	Y	107.3	85914	Y	0.0	0	Y	0.0	0	N	0.0	0
29	90817	1FNA	Y	97.4	90818	Y	82.2	90738	Y	0.0	0	N	0.0	0
29	91322	2TNA	Y	117.6	91329	Y	0.0	0	Y	0.0	0	N	0.0	0
29	91322	1FNC	Y	0.0	91329	Y	76.8	91500	Y	0.0	0	N	0.0	0
29	92105	1FNG	Y	0.0	0	Y	80.8	92023	Y	0.0	0	N	0.0	0
29	92229	3LNE	N	0.0	0	Y	0.0	0	N	0.0	0	N	0.0	0
29	92407	1FNC	Y	99.5	92425	Y	0.0	0	Y	0.0	0	N	0.0	0
29	92605	9FND	Y	99.8	92715	Y	0.0	0	Y	0.0	0	N	0.0	0
29	92654	4TNA	Pr	99.8	92715	Y	0.0	0	Y	0.0	0	N	0.0	0
29	92854	1LNC	Y	0.0	0	Y	93.6	92812	Y	76.7	92842	N	0.0	0
29	93043	3FND	Y	82.6	93053	Y	74.9	93027	Y	0.0	0	N	0.0	0
29	93116	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	93434	4FNG	Y	0.0	0	Y	0.0	0	N	75.9	93405	N	0.0	0
29	93613	4LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	93812	3GNA	N	0.0	0	Y	0.0	0	N	0.0	0	N	0.0	0
29	93940	3FND	Y	97.4	94111	Y	0.0	0	Y	0.0	0	N	0.0	0
29	0	X	N	76.3	94159	N	0.0	0	N	0.0	0	N	0.0	0
29	94233	3LND	Y	81.5	94219	Y	84.8	94027	Y	0.0	0	N	0.0	0
29	94245	1LNE	Y	86.0	94343	Y	0.0	0	Y	0.0	0	N	0.0	0
29	0	2TNA	Y	113.5	94717	Y	0.0	0	Y	0.0	0	N	0.0	0
29	95037	3LNE	Y	0.0	0	Y	84.6	94700	Y	78.2	94741	N	0.0	0
29	0	X	N	79.2	95428	N	0.0	0	N	0.0	0	N	0.0	0
29	95520	3FNG	N	92.1	95619	Y	0.0	0	Y	0.0	0	N	0.0	0
29	95650	3GND	N	105.7	95701	Y	87.2	95626	Y	81.8	95701	N	0.0	0
29	95846	3FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	0	X	N	107.0	100113	N	0.0	0	N	0.0	0	N	0.0	0
29	95912	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	0	X	N	98.5	101300	N	87.3	101235	N	0.0	0	N	0.0	0
29	102016	2TNA	Y	114.6	102002	Y	0.0	0	Y	0.0	0	N	0.0	0
29	0	X	N	77.9	102304	N	85.3	102413	N	76.5	102351	N	0.0	0
29	0	X	N	85.6	102545	N	79.5	102530	N	0.0	0	N	0.0	0
29	0	X	N	103.8	103824	N	77.0	103915	N	0.0	0	N	0.0	0
29	0	X	N	100.9	103936	N	74.5	104949	N	0.0	0	N	0.0	0
29	0	X	N	96.5	105635	N	0.0	0	N	0.0	0	N	0.0	0
29	110245	3LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	110652	7LNE	Y	78.7	110536	Y	73.9	110504	Y	0.0	0	N	0.0	0
29	113431	3TNA	Y	105.3	113358	Y	0.0	0	Y	0.0	0	N	0.0	0
29	114804	1TNA	Y	108.9	114733	Y	0.0	0	Y	0.0	0	N	0.0	0
29	115105	5TNA	Y	118.8	115008	Y	0.0	0	Y	0.0	0	N	0.0	0
29	0	X	N	82.4	115054	N	0.0	0	N	0.0	0	N	0.0	0
29	115415	3TNA	Y	107.2	115317	Y	0.0	0	Y	0.0	0	N	0.0	0
29	115631	7TNA	Y	109.3	115606	Y	79.7	115339	Y	78.1	115435	N	0.0	0
29	120005	3TNA	Y	105.5	115947	Y	0.0	0	Y	0.0	0	N	0.0	0
29	121200	1TNA	Y	107.9	121131	Y	0.0	0	Y	0.0	0	N	0.0	0
29	123227	1FNF	Y	0.0	0	Y	79.8	123126	Y	0.0	0	N	0.0	0
29	123446	1FNB	Y	95.2	123439	Y	0.0	0	Y	0.0	0	N	0.0	0
29	123729	4TNB	Y	98.3	123656	Y	0.0	0	Y	0.0	0	N	0.0	0
29	123801	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	124621	3TNA	Y	106.0	124557	Y	0.0	0	Y	0.0	0	N	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
29	124850	1FNA	Y	97.2	124723	Y	82.7	124631	Y	0.0	0	N	0.0	0
29	0	X	N	79.1	125608	N	0.0	0	N	0.0	0	N	0.0	0
29	125744	4TNH	Y	97.9	125725	Y	0.0	0	Y	0.0	0	N	0.0	0
29	130523	2FNB	Y	106.5	130542	Y	83.7	130516	Y	82.6	130554	N	0.0	0
29	131201	3TNA	Y	106.2	131202	Y	0.0	0	Y	0.0	0	N	0.0	0
29	131434	2FNA	Y	106.0	131451	Y	83.2	131436	Y	79.3	131502	N	0.0	0
29	132233	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	133120	2FNB	Y	104.0	133146	Y	79.6	133120	Y	0.0	0	N	0.0	0
29	133437	3FNG	Y	0.0	0	Y	88.6	433452	N	84.4	133529	N	0.0	0
29	133735	3FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	133920	3LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	134041	2FNB	Y	99.7	134113	Y	83.9	134048	Y	72.0	134129	N	0.0	0
29	135035	2LNE	Y	99.2	134813	Y	82.5	134756	Y	73.5	134830	N	0.0	0
29	135334	3FND	Y	94.7	135427	Y	0.0	0	Y	0.0	0	N	0.0	0
29	135554	4TNA	Y	101.9	135624	Y	0.0	0	Y	0.0	0	N	0.0	0
29	135844	3FNA	Y	96.6	135945	Y	0.0	0	Y	0.0	0	N	0.0	0
29	144622	1LNE	Y	0.0	0	Y	80.4	144609	Y	0.0	0	N	0.0	0
29	145117	ULNE	Y	0.0	0	Y	80.5	144927	Y	0.0	0	N	0.0	0
29	145808	5TNA	Th	123.3	145714	Y	0.0	0	Y	0.0	0	N	0.0	0
29	145820	5TNA	Th	123.3	145714	Y	0.0	0	Y	0.0	0	N	0.0	0
29	145830	5TNA	Th	123.3	145714	Y	0.0	0	Y	0.0	0	N	0.0	0
29	150145	3FNB	Y	95.3	150059	Y	71.0	150023	Y	0.0	0	N	0.0	0
29	150305	1LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	150654	3FND	Y	93.2	150612	Y	0.0	0	Y	0.0	0	N	0.0	0
29	150851	3LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	152517	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	N	0.0	0
29	154255	4R	N	0.0	0	N	0.0	0	N	0.0	0	N	0.0	0
29	154701	1FNB	Y	92.9	154643	Y	83.5	154615	Y	0.0	0	Y	93.4	155634
29	155341	4FNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	155529	4LNG	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	155704	3FNF	N	0.0	0	Y	0.0	0	N	0.0	0	Y	0.0	0
29	155900	1FNC	Y	90.0	155827	Y	83.9	155736	Y	0.0	0	Y	0.0	0
29	160550	1LNC	Y	0.0	0	Y	83.1	160329	Y	0.0	0	Y	0.0	160211
29	161422	2LNE	Y	0.0	0	Y	79.8	161237	Y	77.5	161405	Y	83.5	161141
29	161519	6LNE	Y	0.0	0	Y	85.2	161340	Y	75.9	161426	Y	84.8	161509
29	161628	5FND	Pr	99.1	161533	Pr	86.8	161510	N	0.0	0	Y	0.0	0
29	161628	5LNE	Y	0.0	0	Y	0.0	0	N	0.0	0	Y	0.0	0
29	161628	5FND	Pr	99.1	161533	Pr	86.8	161510	N	0.0	0	Y	0.0	0
29	161755	5LND	Y	0.0	0	Y	0.0	0	N	0.0	0	Y	0.0	0
29	161818	5LND	Y	0.0	0	Y	0.0	0	N	0.0	0	Y	0.0	0
29	165418	1TNA	Y	110.2	165316	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	165747	6TNA	Y	122.6	165639	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	165915	6FNB	Y	97.0	165820	Y	88.5	165746	Y	79.7	165805	Y	97.2	165639
29	171351	6FNB	Y	108.4	171312	Y	86.9	171218	Y	79.3	171303	Y	97.6	171122
29	171704	2FND	Th	111.1	171715	Y	0.0	0	Y	0.0	0	Y	75.8	171602
29	171704	2FND	Th	111.1	171715	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	171704	2FND	Th	111.1	171715	Y	78.4	171600	Y	0.0	0	Y	0.0	0
29	171804	2FND	Pr	105.5	171754	Pr	98.1	171743	Y	0.0	0	Y	0.0	0
29	171833	2LND	Y	0.0	0	Pr	98.1	171743	Y	88.5	171824	Y	0.0	0
29	171850	2FND	Pr	105.5	171754	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	171946	2LND	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	172204	2FND	Y	111.7	172116	Y	82.4	172016	Y	79.2	172103	Y	0.0	0

Ops Log			Site 1			Site 7			Site 8			Site 9		
Day	Time	AORT	#	SEL	Time	#	SEL	Time	#	SEL	Time	#	SEL	Time
29	172516	UFNB	Y	80.8	172502	Y	92.9	172309	Y	95.7	172357	Y	77.4	172452
29	172641	2FND	Y	107.3	172551	Y	79.2	172416	Y	79.4	172459	Y	0.0	0
29	172850	6LNE	Y	0.0	0	Y	88.4	172726	Y	84.3	172745	Y	93.9	172606
29	173106	2FND	Y	109.9	172930	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	173152	2FND	Y	114.4	173113	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	173350	2FND	Y	116.5	173307	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	173543	2FNB	Y	107.7	173505	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	173707	2FSG	Y	95.0	173603	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	173837	2LSG	Y	95.5	173715	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	174444	1LNE	Y	0.0	0	Y	82.9	174240	Y	0.0	0	Y	84.3	174141
29	174947	8LNE	Y	0.0	0	Y	79.0	174802	Y	84.1	174810	Y	0.0	0
29	180530	1TNA	Y	108.7	180418	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	182050	2TNA	Y	110.0	181938	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	184748	4LNE	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	85.3	184504
29	192051	8TSA	Y	0.0	0	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	192855	1TNA	Y	108.2	192755	Y	0.0	0	Y	0.0	0	Y	0.0	0
29	195516	1FNB	Y	100.4	195422	Y	82.9	195327	Y	0.0	0	Y	94.1	195238

☆U.S. Government Printing Office: 1991 — 648-069/40229